

UNITED STATES INTERNATIONAL TRADE COMMISSION  
WASHINGTON, D.C.

Before the Honorable David P. Shaw  
Administrative Law Judge

**In the Matter of**

**CERTAIN SILICON PHOTOVOLTAIC  
CELLS AND MODULES WITH  
NANOSTRUCTURES, AND PRODUCTS  
CONTAINING THE SAME**

**Inv. No. 337-TA-1271**

**HANWHA RESPONDENTS' RESPONSE TO  
THE COMPLAINT AND NOTICE OF INVESTIGATION**

**Respondents:**

Hanwha Q CELLS & Advanced Materials  
Corp.  
86 Cheonggyecheon-ro, Jung-gu  
Seoul, Republic of Korea 04541  
Telephone: +82-02-1600-3400

Hanwha Q Cells GmbH  
Sonnenallee 17 – 21 06766 Bitterfeld-Wolfen  
Federal Republic of Germany  
Telephone: +49-3494-6699-0

Hanwha Q Cells Malaysia Sdn. Bhd.  
Lot 1, Jalan CV 2, Selangor Cyber Valley,  
63300 Cyberjaya, Selangor Malaysia  
Telephone: +60-3-83-15-00-00

Hanwha Q Cells (Qidong) Co., Ltd.  
888 Linyang Road, Qidong Jiangsu 226200  
People's Republic of China  
Telephone: +86-513-8360-6222

Hanwha Solutions Corporation  
24F, 86, Cheonggyecheon-ro, Jung-gu, Seoul,  
Republic of Korea 04541  
Telephone: +82-02-1600-3400

**Counsel for Respondents:**

S. Alex Lasher  
Jeffrey S. Gerchick  
K. Kevin Chu  
Courtney S. Kasuboski  
QUINN EMANUEL URQUHART &  
SULLIVAN, LLP  
1300 I Street, NW, Suite 900  
Washington, D.C. 20005  
Tel.: (202) 538-8000  
Fax: (202) 538-8100

Sean S. Pak  
QUINN EMANUEL URQUHART  
& SULLIVAN, LLP  
50 California St., 22nd Floor  
San Francisco, CA 94111  
Tel.: (415) 875-6600  
Fax: (415) 875-6700

David Nelson  
QUINN EMANUEL URQUHART &  
SULLIVAN, LLP  
191 N Upper Wacker Dr #2700  
Chicago, IL 60606  
Tel.: (312) 705-7400  
Fax: (312) 705-7401

Hanwha Energy USA Holdings Corp.  
(d/b/a 174 Power Global Corporation)  
300 Spectrum Center Dr.  
Irvine, California 92618  
Telephone: (833) 461-7474

Hanwha Q Cell EPC USA LLC  
400 Spectrum Center Drive, Suite 1400  
Irvine, California 92618 USA  
Telephone: (949) 748-5996

Hanwha Q Cells America Inc.  
400 Spectrum Center Drive, Suite 1400  
Irvine, California 92618 USA  
Telephone: (949) 748-5996

Hanwha Q Cells USA Corp.  
300 Spectrum Center Drive, Suite 1250  
Irvine, California 92618 USA  
Telephone: (949) 748-5996

Hanwha Q Cells USA Inc.  
300 Nexus Drive  
Dalton, Georgia 30721  
Telephone: (706) 671-3077

HQC Rock River Solar Holdings LLC  
300 Spectrum Center Drive, Suite 1250  
Irvine, California 92618  
Telephone: (949) 748-5996

HQC Rock River Solar Power Generation  
Station, LLC  
3753 US-51  
Beloit, Wisconsin 53511  
Telephone: (800) 255-4268

D. James Pak  
QUINN EMANUEL URQUHART  
& SULLIVAN, LLP  
865 S. Figueroa St., 10th Floor  
Los Angeles, CA 90017  
Tel.: (213) 443-3000  
Fax: (213) 443-3100

Sean Gloth  
QUINN EMANUEL URQUHART  
& SULLIVAN, LLP  
51 Madison Ave., 22nd Floor  
New York, NY 10010  
Tel.: (202) 849-7000  
Fax: (202) 849-7100

**TABLE OF CONTENTS**

	<b><u>Page</u></b>
RESPONSE TO THE COMPLAINT .....	1
I. INTRODUCTION .....	3
II. COMPLAINANT .....	7
III. PROPOSED RESPONDENTS .....	7
A. Canadian Solar .....	7
B. Hanwha .....	9
C. Boviet.....	13
IV. THE ACCUSED PRODUCTS .....	13
V. THE PATENTS-AT-ISSUE .....	14
A. U.S. Patent No. 8,450,599.....	14
1. Identification of the patent and ownership by ASGT .....	14
2. Non-technical description of the invention of the '599 Patent .....	15
3. Foreign counterparts to the '599 Patent .....	16
B. U.S. Patent No. 8,852,981.....	16
1. Identification of the patent and ownership by ASGT .....	16
2. Non-technical description of the invention of the '981 Patent .....	17
3. Foreign counterparts to the '981 Patent .....	18
C. U.S. Patent No. 9,601,640.....	18
1. Identification of the patent and ownership by ASGT .....	18
2. Non-technical description of the invention of the '640 Patent .....	19
3. Foreign counterparts to the '640 Patent .....	20
D. U.S. Patent No. 9,768,331.....	20
1. Identification of the patent and ownership by ASGT .....	20
2. Non-technical description of the invention of the '331 Patent .....	21
3. Foreign counterparts to the '331 Patent .....	22
E. U.S. Patent No. 10,269,995.....	22
1. Identification of the patent and ownership by ASGT .....	22
2. Non-technical description of the invention of the '995 Patent .....	23
3. Foreign counterparts to the '995 Patent .....	24
F. U.S. Patent No. 10,692,971.....	24
1. Identification of the patent and ownership by ASGT .....	24

2.	Non-technical description of the invention of the '971 Patent .....	25
3.	Foreign counterparts to the '971 Patent .....	26
VI.	UNLAWFUL AND UNFAIR ACTS – PATENT INFRINGEMENT .....	26
A.	Canadian Solar .....	26
1.	Representative involved articles .....	26
2.	Infringement of the Asserted Patents .....	27
3.	Specific instance of importation, sale for importation, or sale after importation .....	30
B.	Hanwha .....	31
1.	Representative involved articles .....	31
2.	Infringement of the Asserted Patents .....	32
3.	Specific instance of importation, sale for importation, or sale after importation .....	36
C.	Boviet .....	37
1.	Representative involved articles .....	37
2.	Infringement of the Asserted Patents .....	38
3.	Specific instance of importation, sale for importation, or sale after importation .....	40
VII.	CLASSIFICATION OF THE INFRINGING PRODUCTS UNDER THE HARMONIZED TARIFF SCHEDULE .....	41
VIII.	LICENSEES .....	41
IX.	DOMESTIC INDUSTRY .....	41
1.	The Technical Prong Of The Domestic Industry Requirement Is Satisfied .....	41
B.	The Economic Prong Of The Domestic Industry Requirement Is Satisfied .....	42
1.	Significant investment in plant and equipment – 337(a)(3)(A) .....	43
2.	Significant employment of labor and capital – 337(a)(3)(B) .....	44
3.	Substantial investments in research and development and engineering – 337(a)(3)(C) .....	44
4.	A domestic industry is in the process of being established .....	44
X.	RELATED LITIGATION .....	44
XI.	REQUESTED RELIEF .....	45
	HANWHA’S ADDITIONAL AFFIRMATIVE DEFENSES .....	46
	HANWHA’S PRAYER FOR RELIEF .....	61

RESPONSE TO THE NOTICE OF INVESTIGATION.....61  
STATEMENT PURSUANT TO COMMISSION RULE 210.13(B).....62

Pursuant to 19 C.F.R. § 210.13, Respondents Hanwha Q CELLS & Advanced Materials Corp., Hanwha Q Cells GmbH, Hanwha Q Cells Malaysia Sdn. Bhd., Hanwha Q Cells (Qidong) Co., Ltd., Hanwha Solutions Corporation, Hanwha Energy USA Holdings Corp. (d/b/a 174 Power Global Corporation), Hanwha Q Cell EPC USA LLC, Hanwha Q Cells America Inc., Hanwha Q Cells USA Corp., Hanwha Q Cells USA Inc., HQC Rock River Solar Holdings LLC, and HQC Rock River Solar Power Generation Station, LLC (collectively, “Hanwha” or “Respondents”),<sup>1</sup> respectfully submit this response (“Response”) to the Complaint Under Section 337 of the Tariff Act of 1930, as Amended (“Complaint”), filed by Complainant Advanced Silicon Group Technologies, LLC (“ASGT” or “Complainant”) on June 11, 2021, and to the Notice of Investigation issued by the United States International Trade Commission on July 14, 2021 (“Notice”). This Response further contains Hanwha’s preliminary affirmative defenses, prayer for relief, and statement pursuant to 19 C.F.R. § 210.13(b).

### **RESPONSE TO THE COMPLAINT**

Hanwha is one of the largest photovoltaic solar cell and solar module manufacturers in the world. Through its cutting-edge research and development, Hanwha shattered the solar energy

---

<sup>1</sup> Hanwha disputes that Hanwha Q CELLS & Advanced Materials Corp. was properly proposed as a Respondent by ASGT. Hanwha Q CELLS & Advanced Materials Corp. was dissolved on January 8, 2020 after it was merged with and into Hanwha Chemical Corporation on January 6, 2020, and it otherwise no longer exists. On January 6, 2020, Hanwha Chemical Corporation was subsequently renamed to Hanwha Solutions Corporation, which ASGT separately named as a Respondent in this Investigation.

Hanwha further disputes that at least Hanwha Q Cells GmbH; Hanwha Q Cells (Qidong) Co., Ltd.; Hanwha Energy USA Holdings Corp. (d/b/a 174 Power Global Corporation); Hanwha Q Cells USA Corp.; HQC Rock River Solar Holdings LLC; and HQC Rock River Solar Power Generation Station, LLC were properly proposed as Respondents by ASGT. None of these entities import into the United States, sell for importation into the United States, or sell within the United States after importation any of the accused silicon photovoltaic cells or modules containing such cells.

conversion efficiency levels of traditional solar cells and revolutionized the performance-to-value ratio of the solar cell industry. Hanwha employs thousands of individuals worldwide to bring its innovations to market, including hundreds of domestic workers in its 300,000 square foot state-of-the-art manufacturing facility in Dalton, Georgia. This facility is the largest solar panel factory in the Western Hemisphere, with the capacity to produce 12,000 photovoltaic modules per day, or 1.7 gigawatts annually. To put this figure in perspective, according to the U.S. Department of Energy, just 1 gigawatt of power is equivalent to 110 million LEDs or roughly 1.3 million horses. <https://www.energy.gov/eere/articles/how-much-power-1-gigawatt>.

ASGT, a non-practicing entity incorporated in Delaware just last year, has no presence in the solar cell industry and seeks solely for its own monetary gain to disrupt Hanwha's efforts to provide affordable high-quality solar panels to the American public. Indeed, ASGT does not claim to produce any products or have a domestic industry of its own, and the only alleged domestic industry product from its sole alleged licensee (Advanced Silicon Group, Inc.) is a biosensor for detecting target proteins in a biological sample—a far cry from solar cells. Complaint Public Ex. 53 (Declaration of Marcie Black) at ¶ 14.

ASGT's attempt to profit off Hanwha's hard work and success is baseless. Despite the asserted patents being based on elementary ideas already known or obvious by the time the applications for those patents were filed, ASGT tellingly tries to sweep in both solar cells and biosensors for detecting target proteins under the scope of the patents. There is no basis to exclude Hanwha from continuing to supply the American public with affordable high-quality solar panels.

\* \* \*

Hanwha denies that it has engaged in unfair competition or violated Section 337 of the Tariff Act of 1930, as amended, by importing, selling for importation, or selling within the United

States after importation any products that infringe any valid and enforceable intellectual property rights at issue in this investigation. Hanwha further denies that any patent claims asserted against it in this investigation are valid or enforceable. The responses below reflect the current status of Hanwha's knowledge and beliefs regarding the subject matter of the allegations to which it responds. Hanwha reserves the right to supplement, modify, and/or amend its responses based on any additional facts or developments that become available or that arise after the filing of this Response.

Hanwha denies each and every allegation averred in the Complaint that is not expressly admitted below. Any factual allegation admitted below is admitted as to only the specific admitted facts, and not as to any purported conclusions, characterizations, implications, or speculations that might follow from the admitted facts. Hanwha responds to the numbered paragraphs of the Complaint as follows. The paragraph numbering in these responses corresponds to the numbered paragraphs in the Complaint.

## **I. INTRODUCTION<sup>2</sup>**

1. Hanwha admits that Complainant purports to have filed the Complaint pursuant to Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337 ("Section 337"). Hanwha further admits that Complainant purports to base its Complaint on the alleged unlawful importation into the United States, sale for importation, and/or sale after importation of certain silicon

---

<sup>2</sup> For ease of reference, Hanwha repeats the headings set forth in the Complaint. In doing so, Hanwha makes no admissions regarding the substance of the headings or any other allegations of the Complaint. Unless explicitly otherwise stated, to the extent that a particular heading can be construed as an allegation, Hanwha specifically denies all such allegations.



photovoltaic cells and modules with nanostructures and products containing the same.<sup>3</sup> Hanwha admits that the Complaint purports to assert infringement based on “certain silicon photovoltaic cells and modules with nanostructures and products containing the same,” which the Complaint refers to as the “Accused Products.” Hanwha denies that such an assertion is correct or proper. Moreover, while Hanwha will, for purposes of this Response and for ease of reference, refer to the accused “certain silicon photovoltaic cells and modules with nanostructures and products containing the same” as the Accused Products (as the Complaint does), Hanwha denies that the scope of the Accused Products is clear or appropriate. Except as specifically admitted, Hanwha denies any remaining allegations and characterizations contained in Paragraph 1 of the Complaint.

2. Hanwha admits that the Complaint purports to name as proposed Respondents Hanwha Q Cells & Advanced Materials Corp.; Hanwha Q Cells GmbH; Hanwha Q Cells Malaysia Sdn. Bhd.; Hanwha Q Cells (Qidong) Co., Ltd.; Hanwha Solutions Corporation; Hanwha Energy USA Holdings Corp. (d/b/a 174 Power Global Corporation); Hanwha Q Cells EPC USA LLC; Hanwha Q Cells America Inc.; Hanwha Q Cells USA Corp.; Hanwha Q Cells USA Inc.; HQC Rock River Solar Holdings LLC; and HQC Rock River Solar Power Generation Station, LLC. Hanwha denies that Hanwha Q CELLS & Advanced Materials Corp.; Hanwha Q Cells GmbH; Hanwha Q Cells (Qidong) Co., Ltd.; Hanwha Energy USA Holdings Corp. (d/b/a 174 Power Global Corporation); Hanwha Q Cells USA Corp.; HQC Rock River Solar Holdings LLC; and HQC Rock River Solar Power Generation Station, LLC were properly proposed as Respondents,

---

<sup>3</sup> Throughout this document, Hanwha references the Complaint’s use of the vague terms “certain silicon photovoltaic cells,” “modules with nanostructures,” and/or “products containing same.” In doing so, Hanwha makes no admissions about the scope or accuracy of those terms as descriptions of the accused products and/or features.

and Hanwha denies that they are involved in importing, selling for importation, or selling within the United States after importation the accused products. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 2 of the Complaint.

3. Hanwha admits that the Complaint purports to be directed to certain of Hanwha's products. Hanwha further admits that the Complaint purports to assert infringement of all of the Asserted Patents, which, according to the Complaint, are United States Patent No. 8,450,599 ('599 Patent), United States Patent No. 8,852,981 ('981 Patent), United States Patent No. 9,601,640 ('640 Patent), United States Patent No. 9,768,331 ('331 Patent), United States Patent No. 10,269,995 ('995 Patent), and United States Patent No. 10,692,971 ('971 Patent).<sup>4</sup> Hanwha denies that such an assertion is correct or proper. Hanwha denies that it infringes any of the Asserted Patents. Hanwha denies any characterizations relating to the Asserted Patents to the extent they purport to attribute to the Asserted Patents anything that is not stated therein. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 3 of the Complaint.

4. Hanwha admits that the Complaint purports to assert infringement of particular claims of the Asserted Patents (the "Asserted Claims"). Hanwha denies that such an assertion is correct or proper. Hanwha denies that it infringes any of the Asserted Claims of the Asserted Patents. Hanwha denies any characterizations relating to the Asserted Claims to the extent they purport to attribute to the Asserted Claims anything that is not stated therein. Except as specifically

---

<sup>4</sup> Hanwha acknowledges that Exhibits 1, 3, 5, 7, 9, and 11 purport to be certified copies of the Asserted Patents.

admitted, Hanwha denies the allegations and characterizations contained in Paragraph 4 of the Complaint.

5. To the extent Paragraph 5 of the Complaint contains conclusions of law, no response is necessary. To the extent Paragraph 5 of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

6. Hanwha acknowledges that the Complainant purports to establish an industry in the United States pursuant to Sections 337(a)(2) and 337(a)(3). To the extent Paragraph 6 of the Complaint contains conclusions of law, no response is necessary. To the extent Paragraph 6 of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

7. Hanwha acknowledges that Complainant purports to seek a permanent limited exclusion order prohibiting entry into the United States certain Accused Products. Hanwha further acknowledges that Complainant purports to seek cease and desist orders prohibiting Hanwha and various other persons and entities from conducting any of the following activities in the United States: offering for sale, selling, importing, transferring, distributing, warehousing inventory for distribution, using, assembling, advertising, marketing, demonstrating, qualifying for use in the products of others, testing, or installing the Accused Products or products containing the Accused Products that infringe the Asserted Claims. Hanwha further acknowledges that Complainant purports to seek the imposition of a bond pursuant during the 60-day Presidential review period. Hanwha denies that Complainant is entitled to any form of remedy and/or relief based on the allegations set forth in the Complaint. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 7 of the Complaint.

## **II. COMPLAINANT**

8. Hanwha acknowledges that ASGT is the Complainant. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in Paragraph 8 of the Complaint, and therefore denies them.

## **III. PROPOSED RESPONDENTS**

### **A. Canadian Solar**

9. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 9 of the Complaint, and therefore denies them.

10. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 10 of the Complaint, and therefore denies them.

11. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 11 of the Complaint, and therefore denies them.

12. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 12 of the Complaint, and therefore denies them.

13. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 13 of the Complaint, and therefore denies them.

14. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 14 of the Complaint, and therefore denies them.

15. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 15 of the Complaint, and therefore denies them.

16. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 16 of the Complaint, and therefore denies them.

17. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 17 of the Complaint, and therefore denies them.

18. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 18 of the Complaint, and therefore denies them.

19. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 19 of the Complaint, and therefore denies them.

20. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 20 of the Complaint, and therefore denies them.

**B. Hanwha**

21. As discussed above, Hanwha Q CELLS & Advanced Materials Corp. was dissolved on January 8, 2020 when it was merged with and into Hanwha Chemical Corporation, and it otherwise no longer exists. Hanwha Chemical Corporation was subsequently renamed to Hanwha Solutions Corporation, which ASGT separately named as a Respondent in this Investigation. Accordingly, Hanwha denies that Hanwha Q Cells & Advanced Materials Corp. is a corporation existing under the laws of the Republic of Korea with its principal place of business at 86 Cheonggyecheon-ro, Jung-gu, Seoul, Republic of Korea 04541. Similarly, Hanwha denies that Hanwha Q Cells & Advanced Materials Corporation imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Hanwha acknowledges that Exhibit 14 purports to contain address information for several named Hanwha entities. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 21 of the Complaint.

22. Hanwha admits that Hanwha Q Cells GmbH is a corporation existing under the laws of the Federal Republic of Germany with a principal place of business at Sonnenallee 17 – 21 06766 Bitterfeld-Wolfen, Federal Republic of Germany. Hanwha denies that Hanwha Q Cells GmbH imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 22 of the Complaint.

23. Hanwha admits that Hanwha Q Cells Malaysia Sdn. Bhd. is a corporation existing under the laws of the Republic of Malaysia with a principal place of business at Lot 1, Jalan CV 2, Selangor Cyber Valley, 63300 Cyberjaya, Selangor, Malaysia. Hanwha admits that Hanwha Q

Cells Malaysia Sdn. Bhd. imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 23 of the Complaint.

24. Hanwha admits that Hanwha Q Cells (Qidong) Co., Ltd is a corporation existing under the laws of the Peoples' Republic of China with a principal place of business at 888 Linyang Road, Qidong Jiangsu 226200, Peoples' Republic of China. Hanwha denies that Hanwha Q Cells (Qidong) Co., Ltd. imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 24 of the Complaint.

25. Hanwha admits that Hanwha Solutions Corporation is a subsidiary of the Hanwha Group and is a corporation existing under the laws of the Republic of Korea with a principal place of business at 24F, 86, Cheonggyecheon-ro, Junggu, Seoul, Republic of Korea 04541. Hanwha admits that Hanwha Solutions Corp., or through its affiliates, imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 25 of the Complaint.

26. Hanwha admits that Hanwha Energy USA Holdings Corp. (d/b/a 174 Power Global Corporation) is a corporation existing under the laws of the State of Delaware with a principal place of business at 300 Spectrum Center Drive, Irvine, California 92618. Hanwha admits that Hanwha Energy USA Holdings Corp. (d/b/a 174 Power Global Corporation) is involved in solar project development in the United States. Hanwha denies that Hanwha Energy USA Holdings

Corp. (d/b/a 174 Power Global Corporation) imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 26 of the Complaint.

27. Hanwha admits that Hanwha Q Cells EPC USA LLC is a limited liability company existing under the laws of the State of Delaware with a principal place of business at 400 Spectrum Center Drive, Suite 1400 Irvine, California 92618. Hanwha admits that Hanwha Q Cells EPC USA LLC imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 27 of the Complaint.

28. Hanwha admits that Hanwha Q Cells America, Inc. is a corporation existing under the laws of the State of California with a principal place of business at 400 Spectrum Center Drive, Suite 1400, Irvine, California 92618. Hanwha admits that Hanwha Q Cells America, Inc. imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 28 of the Complaint.

29. Hanwha admits that Hanwha Q Cells USA Corp. is a corporation existing under the laws of the State of Nevada with a principal place of business at 300 Spectrum Center Drive, Suite 1250, Irvine, California 92618. Hanwha denies that Hanwha Q Cells USA Corp. imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Except as specifically



admitted, Hanwha denies the allegations and characterizations contained in Paragraph 29 of the Complaint.

30. Hanwha admits that Hanwha Q Cells USA Inc. is a corporation existing under the laws of the State of Delaware with a principal place of business at 300 Nexus Drive, Dalton, Georgia 30721. Hanwha admits that Hanwha Q Cells USA Inc. imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 30 of the Complaint.

31. Hanwha admits that HQC Rock River Solar Holdings LLC is a limited liability company existing under the laws of the State of Delaware with a place of business at 300 Spectrum Center Drive, Suite 1250, Irvine, California 92618. Hanwha admits that HQC Rock River Solar Holdings LLC is involved in operating renewable energy power plants. Hanwha denies that HQC Rock River Solar Holdings LLC imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products. Hanwha denies that these products are infringing. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 31 of the Complaint.

32. Hanwha admits that HQC Rock River Solar Power Generation Station, LLC is a limited liability company existing under the laws of the State of Delaware with a principal place of business at 3753 US-51, Beloit, Wisconsin 53511. Hanwha admits that HQC Rock River Solar Power Generation Station, LLC is involved in operating renewable energy power plants. Hanwha denies that HQC Rock River Solar Power Generation Station, LLC imports into the United States, sells for importation, and/or sells within the United States after importing the Accused Products.

Hanwha denies that these products are infringing. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 32 of the Complaint.

**C. Boviet**

33. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 33 of the Complaint, and therefore denies them.

34. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 34 of the Complaint, and therefore denies them.

35. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 35 of the Complaint, and therefore denies them.

**IV. THE ACCUSED PRODUCTS**

36. To the extent Paragraph 36 of the Complaint contains conclusions of law, no response is necessary. To the extent Paragraph 36 of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them. Hanwha admits that Section VI of the Complaint purports to assert instances of the importation, sale for importation, and/or sale after importation of Respondents' Accused Products. Hanwha denies that it infringes any of the Asserted Patents.

37. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 37 of the Complaint, and therefore denies them.

38. To the extent Paragraph 38 of the Complaint contains conclusions of law, no response is necessary. To the extent Paragraph 38 of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them. Hanwha acknowledges that Exhibits 18 and 19 of the Complaint purport to be datasheets for the Q.PLUS-G4.3 280 and Q.PLUS-L-G4.2 345 modules. Hanwha denies that it infringes any of the Asserted Patents.

39. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 39 of the Complaint, and therefore denies them.

40. To the extent Paragraph 40 of the Complaint contains conclusions of law, no response is necessary. To the extent Paragraph 40 of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them. Hanwha denies that it infringes any of the Asserted Patents.

## **V. THE PATENTS-AT-ISSUE**

### **A. U.S. Patent No. 8,450,599**

#### **1. Identification of the patent and ownership by ASGT**

41. Hanwha denies the allegations in Paragraph 41 of the Complaint insofar as they purport to attribute to the '599 Patent anything that is not stated therein. Hanwha admits that U.S. Patent No. 8,450,599 is titled "Nanostructured Devices," was filed on November 16, 2009 as U.S. Patent Application No. 12/619,092, issued on May 28, 2013, and purports to claim the benefit of priority to U.S. Provisional Application No. 61/114,896, filed November 14, 2008; U.S. Provisional Application No. 61/157,386, filed March 4, 2009; and U.S. Provisional Application No. 61/250,418, filed October 9, 2009. Hanwha admits that the '599 Patent, to the extent it is

valid, is subject to a patent term adjustment of no more than 388 days with no terminal disclaimer, and will expire no later than December 9, 2030. Hanwha admits that the '599 Patent identifies Brent A. Buchine, Marcie R. Black, and Faris Modawar as the inventors. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 41 of the Complaint.

42. Hanwha admits that Appendix A to the Complaint purports to be a certified copy of the prosecution history of the '599 Patent, and that Appendix B to the Complaint purports to include pages from technical references mentioned in the prosecution history of the '599 Patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 42 of the Complaint.

43. Hanwha acknowledges that Exhibits 2A-2D to the Complaint purport to be a copy of the assignment record for the '599 Patent. Hanwha acknowledges that Exhibit 21 to the Complaint purports to be a license agreement to the '599 Patent by ASGT to ASG Inc. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in Paragraph 43 of the Complaint, and therefore denies them.

## **2. Non-technical description of the invention of the '599 Patent**

44. Hanwha denies the allegations in Paragraph 44 of the Complaint insofar as they purport to attribute to the '599 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

45. Hanwha denies the allegations in Paragraph 45 of the Complaint insofar as they purport to attribute to the '599 Patent anything that is not stated therein. Hanwha is currently

without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

46. Hanwha denies the allegations in Paragraph 46 of the Complaint insofar as they purport to attribute to the '599 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

47. Hanwha denies the allegations in Paragraph 47 of the Complaint insofar as they purport to attribute to the '599 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

### **3. Foreign counterparts to the '599 Patent**

48. Hanwha denies the allegations in Paragraph 48 of the Complaint insofar as they purport to attribute to the '599 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

#### **B. U.S. Patent No. 8,852,981**

##### **1. Identification of the patent and ownership by ASGT**

49. Hanwha denies the allegations in Paragraph 49 of the Complaint insofar as they purport to attribute to the '981 Patent anything that is not stated therein. Hanwha admits that U.S. Patent No. 8,852,981 is titled "Electrical Contacts to Nanostructured Areas," was filed on

September 19, 2012 as U.S. Patent Application No. 13/622,864, issued on October 7, 2014, and purports to claim the benefit of priority to U.S. Provisional Application No. 61/536,243, filed September 19, 2011. Hanwha admits that the '981 Patent, to the extent it is valid, is subject to a patent term adjustment of no more than 140 days with no terminal disclaimer, and will expire no later than February 6, 2033. Hanwha admits that the '981 Patent identifies Marcie R. Black, Joanne Forziati, Michael Jura, Jeff Miller, Brian Murphy, and Adam Standley as the inventors. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 49 of the Complaint.

50. Hanwha admits that Appendix C to the Complaint purports to be a certified copy of the prosecution history of the '981 Patent, and that Appendix D to the Complaint purports to include pages from technical references mentioned in the prosecution history of the '981 Patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 50 of the Complaint.

51. Hanwha acknowledges that Exhibits 4A-4D to the Complaint purport to be a copy of the assignment record for the '981 Patent. Hanwha acknowledges that Exhibit 21 to the Complaint purports to be a license agreement to the '981 patent by ASGT to ASG Inc. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in Paragraph 51 of the Complaint, and therefore denies them.

## **2. Non-technical description of the invention of the '981 Patent**

52. Hanwha denies the allegations in Paragraph 52 of the Complaint insofar as they purport to attribute to the '981 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining

allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

53. Hanwha denies the allegations in Paragraph 53 of the Complaint insofar as they purport to attribute to the '981 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

### **3. Foreign counterparts to the '981 Patent**

54. Hanwha denies the allegations in Paragraph 54 of the Complaint insofar as they purport to attribute to the '981 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

#### **C. U.S. Patent No. 9,601,640**

##### **1. Identification of the patent and ownership by ASGT**

55. Hanwha denies the allegations in Paragraph 55 of the Complaint insofar as they purport to attribute to the '640 Patent anything that is not stated therein. Hanwha admits that U.S. Patent No. 9,601,640 is titled "Electrical Contacts to Nanostructured Areas," was filed on March 21, 2017 as U.S. Patent Application No. 14/468,219, issued on March 21, 2017, and purports to claim the benefit of priority to U.S. Provisional Application No. 61/536,243, filed September 19, 2011, and U.S. Patent Application No. 13/622,864 filed September 19, 2012. Hanwha admits that the '640 Patent, to the extent it is valid, is subject to a patent term adjustment of no more than 249 days with no terminal disclaimer, and will expire no later than May 26, 2033. Hanwha admits that the '640 Patent identifies Marcie R. Black, Joanne Forziati, Michael Jura, Jeffrey Miller, Brian

Murphy, and Adam Standley as the inventors. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 55 of the Complaint.

56. Hanwha admits that Appendix E to the Complaint purports to be a certified copy of the prosecution history of the '640 Patent, and that Appendix F to the Complaint purports to include pages from technical references mentioned in the prosecution history of the '640 Patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 56 of the Complaint.

57. Hanwha denies that Exhibits 6A-6D to the Complaint purport to be a copy of the assignment record for the '981 Patent. Hanwha acknowledges that Exhibit 21 to the Complaint purports to be a license agreement to the '640 Patent by ASGT to ASG Inc. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in Paragraph 57 of the Complaint, and therefore denies them.

## **2. Non-technical description of the invention of the '640 Patent**

58. Hanwha denies the allegations in Paragraph 58 of the Complaint insofar as they purport to attribute to the '640 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

59. Hanwha denies the allegations in Paragraph 59 of the Complaint insofar as they purport to attribute to the '640 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.



60. Hanwha denies the allegations in Paragraph 60 of the Complaint insofar as they purport to attribute to the '640 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

### **3. Foreign counterparts to the '640 Patent**

61. Hanwha denies the allegations in Paragraph 61 of the Complaint insofar as they purport to attribute to the '640 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

#### **D. U.S. Patent No. 9,768,331**

##### **1. Identification of the patent and ownership by ASGT**

62. Hanwha denies the allegations in Paragraph 62 of the Complaint insofar as they purport to attribute to the '331 Patent anything that is not stated therein. Hanwha admits that U.S. Patent No. 9,768,331 is titled "Screen Printing Electrical Contact to Nanowire Areas," was filed on July 23, 2014 as U.S. Patent Application No. 14/338,752, issued on September 19, 2017, is a continuation of International Application No. PCT/US2013/025958, which was filed on February 13, 2013, and purports to claim the benefit of priority to U.S. Provisional Application No. 61/598,717, filed February 14, 2012. Hanwha admits that the '331 Patent, to the extent it is valid, is subject to a patent term adjustment of no more than 288 days with no terminal disclaimer, and will expire no later than February 13, 2033. Hanwha admits that the '331 Patent identifies Michael Jura, Marcie R. Black, Jeffrey Miller, Joanne Yim, Joanne Forziati, Brian P. Murphy, and Richard

Chleboski as the inventors. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 62 of the Complaint.

63. Hanwha admits that Appendix G to the Complaint purports to be a certified copy of the prosecution history of the '331 Patent, and that Appendix H to the Complaint purports to include pages from technical references mentioned in the prosecution history of the '331 Patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 63 of the Complaint.

64. Hanwha denies that a copy of the assignment record for the '981 Patent is attached hereto as Exhibits 8A-8E. Hanwha acknowledges that Exhibit 21 to the Complaint purports to be a license agreement to the '331 Patent by ASGT to ASG Inc. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in Paragraph 64 of the Complaint, and therefore denies them.

## **2. Non-technical description of the invention of the '331 Patent**

65. Hanwha denies the allegations in Paragraph 65 of the Complaint insofar as they purport to attribute to the '331 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

66. Hanwha denies the allegations in Paragraph 66 of the Complaint insofar as they purport to attribute to the '331 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

67. Hanwha denies the allegations in Paragraph 67 of the Complaint insofar as they purport to attribute to the '331 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

### **3. Foreign counterparts to the '331 Patent**

68. Hanwha denies the allegations in Paragraph 68 of the Complaint insofar as they purport to attribute to the '331 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

#### **E. U.S. Patent No. 10,269,995**

##### **1. Identification of the patent and ownership by ASGT**

69. Hanwha denies the allegations in Paragraph 69 of the Complaint insofar as they purport to attribute to the '995 Patent anything that is not stated therein. Hanwha admits that U.S. Patent No. 10,269,995 is titled "Screen Printing Electrical Contact to Nanowire Areas," was filed on June 14, 2017 as U.S. Patent Application No. 15/622,422, issued on April 23, 2019, is a continuation of U.S. Application No. 14/338,752, which was filed on July 23, 2014, which issued as the '331 patent. Hanwha admits that the '331 patent was filed on July 23, 2014 as U.S. Patent Application No. 14/338,752, issued on September 19, 2017, is a continuation of International Application No. PCT/US2013/025958, which was filed on February 13, 2013, and purports to claim the benefit of priority to U.S. Provisional Application No. 61/598,717, filed February 14, 2012. Hanwha admits that the '995 Patent, to the extent it is valid, will expire no later than February 13, 2033. Hanwha admits that the '995 Patent identifies Michael Jura, Marcie R. Black,

Jeffrey B. Miller, Joanne Yim, Joanne Forziati, Brian P. Murphy, and Richard Chleboski as the inventors. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 69 of the Complaint.

70. Hanwha admits that Appendix I to the Complaint purports to be a certified copy of the prosecution history of the '995 Patent, and that Appendix J to the Complaint purports to include pages from technical references mentioned in the prosecution history of the '995 Patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 70 of the Complaint.

71. Hanwha denies that a copy of the assignment record for the '981 Patent is attached hereto as Exhibits 10A-10E. Hanwha acknowledges that Exhibit 21 to the Complaint purports to be a license agreement to the '995 Patent by ASGT to ASG Inc. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in Paragraph 71 of the Complaint, and therefore denies them.

## **2. Non-technical description of the invention of the '995 Patent**

72. Hanwha denies the allegations in Paragraph 72 of the Complaint insofar as they purport to attribute to the '995 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

73. Hanwha denies the allegations in Paragraph 73 of the Complaint insofar as they purport to attribute to the '995 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

### **3. Foreign counterparts to the '995 Patent**

74. Hanwha denies the allegations in Paragraph 74 of the Complaint insofar as they purport to attribute to the '995 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

#### **F. U.S. Patent No. 10,692,971**

##### **1. Identification of the patent and ownership by ASGT**

75. Hanwha denies the allegations in Paragraph 75 of the Complaint insofar as they purport to attribute to the '971 Patent anything that is not stated therein. Hanwha admits that U.S. Patent No. 10,692,971 is titled "Process for Fabricating Silicon Nanostructures," was filed on August 3, 2018 as U.S. Patent Application No. 16/054,457, issued on June 23, 2020, and is a continuation of U.S. Application No. 15/826,005, which was filed on November 29, 2017 (now abandoned), and in turn is a divisional application of U.S. Patent Application No. 14/924,273, filed on October 27, 2015 (now U.S. Patent No. 9,859,366). Hanwha admits that U.S. Patent Application No. 14/924,273 is a continuation application of U.S. Patent Application No. 14/444,361, filed July 28, 2014 (now U.S. Patent No. 9,202,868), which is a continuation application of U.S. Patent Application No. 13/305,649, filed November 28, 2011 (now U.S. Patent No. 8,791,449). Hanwha admits that U.S. Patent Application No. 13/305,649 is a continuation of U.S. Patent Application No. 12/423,623, filed April 14, 2009 (now U.S. Patent No. 8,143,143). Hanwha admits that the '971 Patent claims the benefit of priority to U.S. Provisional Application Nos. 61/114,082 (filed on December 29, 2008) and 61/044,573 (filed April 14, 2008). Hanwha admits that the '971 Patent, to the extent it is valid, will expire no later than April 14, 2029. Hanwha admits that the '971 Patent identifies Brent A. Buchine, Marcie R. Black, and Faris

Modawar as the inventors. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 75 of the Complaint.

76. Hanwha admits that Appendix K to the Complaint purports to be a certified copy of the prosecution history of the '971 Patent, and that Appendix L to the Complaint purports to include pages from technical references mentioned in the prosecution history of the '971 Patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 76 of the Complaint.

77. Hanwha denies that a copy of the assignment record for the '981 Patent is attached hereto as Exhibits 12A-12D. Hanwha acknowledges that Exhibit 21 to the Complaint purports to be a license agreement to the '971 Patent by ASGT to ASG Inc. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 77 of the Complaint.

## **2. Non-technical description of the invention of the '971 Patent**

78. Hanwha denies the allegations in Paragraph 78 of the Complaint insofar as they purport to attribute to the '971 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

79. Hanwha denies the allegations in Paragraph 79 of the Complaint insofar as they purport to attribute to the '971 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

80. Hanwha denies the allegations in Paragraph 80 of the Complaint insofar as they purport to attribute to the '971 Patent anything that is not stated therein. Hanwha is currently

without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

81. Hanwha denies the allegations in Paragraph 81 of the Complaint insofar as they purport to attribute to the '971 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

### **3. Foreign counterparts to the '971 Patent**

82. Hanwha denies the allegations in Paragraph 82 of the Complaint insofar as they purport to attribute to the '971 Patent anything that is not stated therein. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them.

## **VI. UNLAWFUL AND UNFAIR ACTS – PATENT INFRINGEMENT**

### **A. Canadian Solar**

#### **1. Representative involved articles**

83. To the extent Paragraph 83 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

84. To the extent Paragraph 84 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact,

Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

85. To the extent Paragraph 85 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

86. To the extent Paragraph 86 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

87. To the extent Paragraph 87 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

## **2. Infringement of the Asserted Patents**

88. To the extent Paragraph 88 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

### **a. Testing Analysis**

89. To the extent Paragraph 89 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.



**b. Infringement of the '599 Patent**

90. To the extent Paragraph 90 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

91. To the extent Paragraph 91 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**c. Infringement of the '981 Patent**

92. To the extent Paragraph 92 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

93. To the extent Paragraph 93 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**d. Infringement of the '640 Patent**

94. To the extent Paragraph 94 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

95. To the extent Paragraph 95 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**e. Infringement of the '331 Patent**

96. To the extent Paragraph 96 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

97. To the extent Paragraph 97 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**f. Infringement of the '995 Patent**

98. To the extent Paragraph 98 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

99. To the extent Paragraph 99 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**g. Infringement of the '971 Patent**

100. To the extent Paragraph 100 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

101. To the extent Paragraph 101 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**3. Specific instance of importation, sale for importation, or sale after importation**

102. To the extent Paragraph 102 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

103. To the extent Paragraph 103 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

104. To the extent Paragraph 104 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

## **B. Hanwha**

### **1. Representative involved articles**

To the extent this portion of the Complaint preceding Paragraph 105 contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 34 (pictured in Figure 5 in the Complaint) purports to be an image of a portion of the Hanwha Q.PLUS-G4.3 280 module. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this portion of the Complaint, which was not provided a paragraph number.

105. To the extent Paragraph 105 of the Complaint contains conclusions of law, no response is necessary. Hanwha denies that it infringes any of the Asserted Patents. Hanwha acknowledges that Exhibit 35 (pictured in Figure 6 in the Complaint) purports to be an image of a portion of the Hanwha Q.PLUS-G4.3 280 module. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

106. To the extent Paragraph 106 of the Complaint contains conclusions of law, no response is necessary. Hanwha denies that it infringes any of the Asserted Patents. Hanwha acknowledges that Exhibit 36 (pictured in Figure 7 in the Complaint) purports to be an image of a portion of the Hanwha Q.PLUS-L-G4.2 345 module. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

107. To the extent Paragraph 107 of the Complaint contains conclusions of law, no response is necessary. Hanwha denies that it infringes any of the Asserted Patents. Hanwha acknowledges that Exhibit 37 (pictured in Figure 8 in the Complaint) purports to be an image of a portion of the Hanwha Q.PLUS-L-G4.2 345 module. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

108. To the extent Paragraph 108 of the Complaint contains conclusions of law, no response is necessary. Hanwha admits that certain of Hanwha's Q.PLUS-G4.3 280 modules have

previously been manufactured, imported, sold for importation, and/or sold after importation by or on behalf of Hanwha. Hanwha denies that it infringes any of the Asserted Patents. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

109. To the extent Paragraph 109 of the Complaint contains conclusions of law, no response is necessary. Hanwha admits that certain of Hanwha's Q.PLUS-L-G4.2 345 modules have previously been manufactured, imported, sold for importation, and/or sold after importation by or on behalf of Hanwha. Hanwha denies that it infringes any of the Asserted Patents. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

110. To the extent Paragraph 110 of the Complaint contains conclusions of law, no response is necessary. Hanwha admits that certain of Hanwha's Q.PLUS-G4.3 280 and Q.PLUS-L-G4.2 345 modules have previously been manufactured, imported, sold for importation, and/or sold after importation by or on behalf of Hanwha. Hanwha denies that it infringes any of the Asserted Patents. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

## **2. Infringement of the Asserted Patents**

111. To the extent Paragraph 111 of the Complaint contains conclusions of law, no response is necessary. Hanwha admits that certain of Hanwha's Q.PLUS-G4.3 280 and Q.PLUS-L-G4.2 345 modules have previously been manufactured, imported, sold for importation, and/or sold after importation by or on behalf of Hanwha. Hanwha denies that it infringes any of the Asserted Patents. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

**a. Testing Analysis**

112. To the extent Paragraph 112 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 26 purports to include images of a portion of the Hanwha Q.PLUS-G4.3 280 and Q.PLUS-L-G4.2 345 modules. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

**b. Infringement of the '599 Patent**

113. To the extent Paragraph 113 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 38 purports to include a claim chart applying claims 15, 17, 23, 24, 25, and 27 of the '599 Patent to the Hanwha Q.PLUS-G4.3 280 module. Hanwha denies that it infringes this patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

114. To the extent Paragraph 114 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 39 purports to include a claim chart applying claims 15, 17, 23, and 27 of the '599 Patent to the Hanwha Q.PLUS-L-G4.2 345 module. Hanwha denies that it infringes this patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

115. To the extent Paragraph 115 of the Complaint contains conclusions of law, no response is necessary. Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

**c. Infringement of the '981 Patent**

116. To the extent Paragraph 116 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 38 purports to include a claim chart

applying claims 1, 2, 4, 13, 18, 23, 26, and 27 of the '981 Patent to the Hanwha Q.PLUS-G4.3 280 module. Hanwha acknowledges that Exhibit 39 purports to include a claim chart applying claims 1, 2, 4, 13, 18, 23, 26, and 27 of the '981 Patent to the Hanwha Q.PLUS-L-G4.2 345 module. Hanwha denies that it infringes this patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

117. To the extent Paragraph 117 of the Complaint contains conclusions of law, no response is necessary. Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

**d. Infringement of the '640 Patent**

118. To the extent Paragraph 118 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 38 purports to include a claim chart applying claims 1, 4, 11, 12, 13, 14, 16, 17, and 18 of the '640 Patent to the Hanwha Q.PLUS-G4.3 280 module. Hanwha acknowledges that Exhibit 39 purports to include a claim chart applying claims 1, 4, 11, 12, 13, 14, 16, 17, and 18 of the '640 Patent to the Hanwha Q.PLUS-L-G4.2 345 module. Hanwha denies that it infringes this patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

119. To the extent Paragraph 119 of the Complaint contains conclusions of law, no response is necessary. Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

**e. Infringement of the '331 Patent**

120. To the extent Paragraph 120 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 38 purports to include a claim chart applying claims 1, 2, and 10 of the '331 Patent to the Hanwha Q.PLUS-G4.3 280 module. Hanwha

acknowledges that Exhibit 39 purports to include a claim chart applying claims 1, 2, and 10 of the '331 Patent to the Hanwha Q.PLUS-L-G4.2 345 module. Hanwha denies that it infringes this patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

121. To the extent Paragraph 121 of the Complaint contains conclusions of law, no response is necessary. Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

**f. Infringement of the '995 Patent**

122. To the extent Paragraph 122 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 38 purports to include a claim chart applying claims 1, 2, and 7-11 of the '995 Patent to the Hanwha Q.PLUS-G4.3 280 module. Hanwha acknowledges that Exhibit 39 purports to include a claim chart applying claims 1, 2, and 7-11 of the '995 Patent to the Hanwha Q.PLUS-L-G4.2 345 module. Hanwha denies that it infringes this patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

123. To the extent Paragraph 123 of the Complaint contains conclusions of law, no response is necessary. Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

**g. Infringement of the '971 Patent**

124. To the extent Paragraph 124 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 38 purports to include a claim chart applying claims 1, 7, 8, 10, and 15 of the '971 Patent to the Hanwha Q.PLUS-G4.3 280 module. Hanwha acknowledges that Exhibit 39 purports to include a claim chart applying claims 1, 7, 8,



10, and 15 of the '971 Patent to the Hanwha Q.PLUS-L-G4.2 345 module. Hanwha denies that it infringes this patent. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

125. To the extent Paragraph 125 of the Complaint contains conclusions of law, no response is necessary. Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

**3. Specific instance of importation, sale for importation, or sale after importation**

126. To the extent Paragraph 126 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 40 purports to be a copy of Hanwha's Auditor's Report accompanying Consolidated Financial Statements for December 31, 2019 and 2018. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

127. To the extent Paragraph 127 of the Complaint contains conclusions of law, no response is necessary. Hanwha admits that at least some Hanwha Q-Cells Q.PLUS-G4.3 280 modules and Hanwha Q-Cells Q.PLUS-L-G4.2 345 modules have previously been manufactured outside of the United States and imported for sale to customers in the United States. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

128. To the extent Paragraph 128 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 41 purports to show the purchase of ten Hanwha Q-Cells Q.PLUS-G4.3 280 modules. Hanwha acknowledges that Exhibit 42 purports to indicate that the specific Hanwha Q-Cells Q.PLUS-G4.3 280 module in the exhibit was made in Korea. Hanwha is currently without knowledge or information sufficient to form a belief as to

the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

129. To the extent Paragraph 129 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 44 purports to show the purchase of a Hanwha Q.PLUS-L-G4.2 345 module. Hanwha acknowledges that Exhibit 45 purports to indicate that the specific Hanwha Q.PLUS-L-G4.2 345 module in the exhibit was made in Korea. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in this Paragraph of the Complaint, and therefore denies them. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in this Paragraph of the Complaint.

### **C. Boviet**

#### **1. Representative involved articles**

130. To the extent Paragraph 130 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

131. To the extent Paragraph 131 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

132. To the extent Paragraph 132 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact,

Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**2. Infringement of the Asserted Patents**

133. To the extent Paragraph 133 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**a. Testing Analysis**

134. To the extent Paragraph 134 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**b. Infringement of the '599 Patent**

135. To the extent Paragraph 135 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

136. To the extent Paragraph 136 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**c. Infringement of the '981 Patent**

137. To the extent Paragraph 137 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact,

Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

138. To the extent Paragraph 138 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**d. Infringement of the '640 Patent**

139. To the extent Paragraph 139 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

140. To the extent Paragraph 140 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**e. Infringement of the '331 Patent**

141. To the extent Paragraph 141 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

142. To the extent Paragraph 142 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact,

Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**f. Infringement of the '995 Patent**

143. To the extent Paragraph 143 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

144. To the extent Paragraph 144 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**g. Infringement of the '971 Patent**

145. To the extent Paragraph 145 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

146. To the extent Paragraph 146 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**3. Specific instance of importation, sale for importation, or sale after importation**

147. To the extent Paragraph 147 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact,

Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

148. To the extent Paragraph 148 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

## **VII. CLASSIFICATION OF THE INFRINGING PRODUCTS UNDER THE HARMONIZED TARIFF SCHEDULE**

149. To the extent Paragraph 149 of the Complaint contains conclusions of law, no response is necessary. Hanwha admits that certain of Hanwha's products have been imported into the United States under Harmonized Tariff Schedule numbers 8541.40.6015, 8541.40.6025. Except as specifically admitted, Hanwha denies the allegations and characterizations contained in Paragraph 149 of the Complaint.

## **VIII. LICENSEES**

150. To the extent Paragraph 150 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 21 purports to be a copy of a license relating to the Asserted Patents and that Complainant claims that the license grant is from ASGT to ASG Inc. Hanwha denies the remaining allegations and characterizations contained in Paragraph 150 of the Complaint.

## **IX. DOMESTIC INDUSTRY**

### **1. The Technical Prong Of The Domestic Industry Requirement Is Satisfied**

151. To the extent Paragraph 151 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 53 of the Complaint purports to be a declaration from Marcie Black. To the extent this Paragraph of the Complaint contains allegations

of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

152. To the extent Paragraph 152 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

153. To the extent Paragraph 153 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 54 of the Complaint purports to be a claim chart related to the alleged ASG Inc. Domestic Industry Product. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**B. The Economic Prong Of The Domestic Industry Requirement Is Satisfied**

154. To the extent Paragraph 154 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

155. To the extent Paragraph 155 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 53 of the Complaint purports to be a declaration from Marcie Black. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**1. Significant investment in plant and equipment – 337(a)(3)(A)**

156. To the extent Paragraph 156 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 53 of the Complaint purports to be a declaration from Marcie Black. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

157. To the extent Paragraph 157 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

158. To the extent Paragraph 158 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

159. To the extent Paragraph 159 of the Complaint contains conclusions of law, no response is necessary. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

160. To the extent Paragraph 160 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 53 of the Complaint purports to be a declaration from Marcie Black. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.



**2. Significant employment of labor and capital – 337(a)(3)(B)**

161. To the extent Paragraph 161 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 53 of the Complaint purports to be a declaration from Marcie Black. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**3. Substantial investments in research and development and engineering – 337(a)(3)(C)**

162. To the extent Paragraph 162 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 53 of the Complaint purports to be a declaration from Marcie Black. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**4. A domestic industry is in the process of being established**

163. To the extent Paragraph 163 of the Complaint contains conclusions of law, no response is necessary. Hanwha acknowledges that Exhibit 53 of the Complaint purports to be a declaration from Marcie Black. To the extent this Paragraph of the Complaint contains allegations of fact, Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations, and therefore denies them.

**X. RELATED LITIGATION**

164. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 164 of the Complaint, and therefore denies them.

165. Hanwha admits that ASGT filed a patent infringement lawsuit alleging infringement of the Asserted Patents against certain Hanwha entities in the Central District of California, Case No. 8:21-cv-01034. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the remaining allegations and characterizations contained in Paragraph 165 of the Complaint, and therefore denies them.

166. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 166 of the Complaint, and therefore denies them.

167. Hanwha is currently without knowledge or information sufficient to form a belief as to the truth of the allegations and characterizations contained in Paragraph 167 of the Complaint, and therefore denies them.

## **XI. REQUESTED RELIEF**

To the extent a response is necessary, Hanwha denies that Complainant is entitled to any relief whatsoever, including without limitation the relief requested in the Complaint, including subparagraphs (a) through (f) of the section entitled “Relief Requested.” The Complaint did not assign this paragraph a paragraph number.

## **HANWHA'S ADDITIONAL AFFIRMATIVE DEFENSES<sup>5</sup>**

1. Hanwha asserts the following additional affirmative defenses. Hanwha's inclusion of these affirmative defenses in this Response is not a concession that Hanwha bears the burden of proof with respect to any of them. Discovery is ongoing as of the time of this Response and thus Hanwha has not fully collected and reviewed all of the information that may be relevant to the matters and issues raised herein. Accordingly, pursuant to 19 C.F.R. §§ 210.14(b) and 210.14(c), Hanwha reserves the right to seek amendment of, modify, and/or expand these defenses, and to take further positions as discovery proceeds in this investigation.

### **FIRST AFFIRMATIVE DEFENSE (Invalidity)**

2. The Asserted Claims of the Asserted Patents are each invalid for failure to meet the requirements set forth in 35 U.S.C. §§ 101, 102, 103, 112, 116, and/or 256.

3. All Asserted Claims of the Asserted Patents are invalid under 35 U.S.C. § 102 and/or § 103 in view of at least the prior art identified in **Appendix A**, either alone or in combination. As discovery is ongoing, Hanwha reserves the right to rely on additional prior art.

### **SECOND AFFIRMATIVE DEFENSE (Non-Infringement)**

4. Hanwha does not directly infringe, indirectly infringe, contribute to infringement, or induce infringement of any valid or enforceable claim of the Asserted Patents, either literally or under the doctrine of equivalents, and has not otherwise committed any acts in violation of 35 U.S.C. § 271 or 19 U.S.C. § 1337.

---

<sup>5</sup> The following headings and numbered paragraphs do not correspond to the headings and numbered paragraphs in the Complaint.

**THIRD AFFIRMATIVE DEFENSE  
(Lack of Domestic Industry)**

5. To the extent that Hanwha determines through discovery and investigation that no protectable industry exists or is being established in the United States as defined under Section 337 with respect to any of the claims of the Asserted Patents, Hanwha reserves the right to assert the lack of domestic industry as a defense.

**FOURTH AFFIRMATIVE DEFENSE  
(Lack of Unfair Act)**

6. Hanwha has committed no unfair act.

**FIFTH AFFIRMATIVE DEFENSE  
(Unenforceability)**

7. On information and belief, ASGT is not entitled to any relief against Hanwha in this investigation because the Asserted Patents are unenforceable.

**SIXTH AFFIRMATIVE DEFENSE  
(Equitable Estoppel)**

8. On information and belief, ASGT's claims against Hanwha are barred by the doctrine of equitable estoppel.

**SEVENTH AFFIRMATIVE DEFENSE  
(Waiver)**

9. On information and belief, ASGT's claims against Hanwha are barred by the doctrine of waiver.

**EIGHTH AFFIRMATIVE DEFENSE  
(Prosecution History Estoppel and/or Disclaimer)**

10. On information and belief, due to admissions and statements made to the United States Patent and Trademark Office during the prosecution of the applications that resulted in the Asserted Patents or related patent applications, ASGT is estopped from construing a valid and enforceable claim, if any, of the Asserted Patents as infringed literally or under the doctrine of

equivalents by the Accused Products.

**NINTH AFFIRMATIVE DEFENSE  
(No Importation and/or No Jurisdiction to Issue Remedy)**

11. Respondents cannot violate Section 337 if they do not import into the United States, sell for importation into the United States, or sell within the United States after importation any Accused Products. Such Respondents should be dismissed from this investigation.

12. The Commission lacks jurisdiction to the extent any Accused Products are not imported into the United States, sold for importation into the United States, or sold after importation into the United States. The Commission lacks statutory authority to issue a remedy as to any such products.

**TENTH AFFIRMATIVE DEFENSE  
(Ensnarement)**

13. ASGT's claims of infringement under the doctrine of equivalents are barred in whole or in part by the doctrine of ensnarement. To the extent ASGT's asserted range of equivalence encompasses the Accused Products, it would also impermissibly encompass the prior art.

**ELEVENTH AFFIRMATIVE DEFENSE  
(Improper Inventorship)**

14. To the extent that the alleged inventors did not invent the purported inventions, or to the extent that the actual inventors are not named as inventors, the Asserted Patents are unenforceable.

**TWELFTH AFFIRMATIVE DEFENSE  
(License / Exhaustion / Implied License)**

15. On information and belief, ASGT is barred from obtaining any relief sought in the Complaint to the extent the Asserted Patents are subject to one or more licenses. In addition,

ASGT is barred from obtaining any relief sought in the Complaint to the extent that the Asserted Patents are subject to the doctrines of patent exhaustion or implied license.

**THIRTEENTH AFFIRMATIVE DEFENSE  
(Inequitable Conduct and Unclean Hands to '331 and '995 patents)**

16. On information and belief, ASGT is barred from obtaining any relief sought in the Complaint as to the '331 and '995 patents based on the doctrines of inequitable conduct and unclean hands.

17. On information and belief, the following persons were substantively involved in the prosecution of the '640 patent: John N. Anastasi, Gregory K. Gerstenzang, Alexandra Gerard, Marcus E. Browne, Matthew H. Grady, and Flavio M. Rose.

18. According to the Patent Office submissions, Mr. Anastasi, Mr. Gerstenzang, Mr. Browne, and Mr. Grady were attorneys and/or patent agents at Lando & Anastasi, LLP and worked in the same office. On information and belief, Mr. Rose was in-house counsel for the applicant.

19. On information and belief, the following persons were substantively involved in the prosecution of the '331 patent: John N. Anastasi, Gregory K. Gerstenzang, Alexandra Gerard, and Flavio M. Rose.

20. On information and belief, the following persons were substantively involved in the prosecution of the '995 patent: John N. Anastasi, Gregory K. Gerstenzang, and Alexandra Gerard.

21. The substantive involvement of these individuals is shown by them filing, signing, or being listed on the signature blocks of, submissions to the Patent Office during prosecution.

22. At least John Anastasi and Gregory Gerstenzang were involved with prosecuting all three patents (the '331, the '640, and the '995). Flavio Rose was also involved in prosecuting at least the '331 and '640 patents. On information and belief, Marcus Browne and Matthew Grady

were also substantively involved in prosecuting the '331 patent, in addition to the '640 patent. For example, Mr. Brown and Mr. Grady worked in the same law firm office as John Anastasi and Gregory Gerstenzang, and the patents were all being prosecuted on behalf of the same client. On information and belief, Mr. Browne worked at Lando & Anastasi, LLP between at least January 2013 and April 2016, and Mr. Grady worked there from at least 2005 to January 2016. During this timeframe, both the '640 and the '331 patents were pending, and Oh WO was identified in a September 2015 IDS signed by Mr. Browne in connection with the '640 patent.

23. The following persons are named inventors on all of the '331, '640, and '995 patents: Marcie R. Black, Joanne Forziati, Michael Jura, Jeffrey B. Miller, and Brian P. Murphy.

24. Joanne Yim and Richard Chleboski are additional named inventors on the '331 and '995 patents.

25. Adam Standley is an additional named inventor on the '640 patent.

26. The named inventors signed oaths that were submitted with their respective applications attesting to being the inventors of the alleged invention(s) claimed in the applications.

27. A power of attorney was submitted in connection with the prosecution of each of the '331, '640, and '995 patents. On information and belief based on the face of the document, it was signed by named inventor Marcie Black on June 2, 2015, and states that she was CEO of assignee Advanced Silicon Group, Inc. and had authority to sign on their behalf. On information and belief, Ms. Black was also substantively involved in prosecution.

28. Oh WO (International Publication No. WO 2012/121706) is prior art. It has an effective filing date at least as early as March 8, 2011. The '331 and '995 patents on their face purport to claim an earliest priority date of February 14, 2012, through a provisional application. Thus, even if the provisional priority claim were entirely valid (which Hanwha does not concede),

Oh WO would be prior art to the '331 and '995 patents.

29. On information and belief, the Applicant and its Counsel knew of Oh WO but did not disclose it to the PTO in connection with the prosecution of the '331 and '995 patents.

30. Oh WO was cited in a September 25, 2015 information disclosure statement ("IDS") in connection with prosecution of the '640 patent. The IDS was submitted by the Lando & Anistasi, LLP firm, signed by Marcus Browne.

31. The '331 patent was still being prosecuted when the September 2015 IDS was submitted. It was filed on July 23, 2014 and issued on September 19, 2017. After the IDS was submitted in the '640 patent prosecution, the applicant submitted multiple office action responses in the '331 patent prosecution, but did not disclose Oh WO.

32. The '995 patent was not filed until after the September 2015 IDS was submitted, and on information and belief, Oh WO was known to the applicant and its attorneys/patent agents at Lando & Anistasi, LLP during the entirety of the '995 patent's prosecution. The '995 patent was filed on June 14, 2017 and issued on April 23, 2019.

33. The '640 patent had a different primary examiner in a different art unit from the '331 and '995 patents. The primary examiner for the '640 patent was Long Tran in art unit 2829. The primary examiner for the '331 and '995 patents was Bach Dinh in art unit 1756.

34. On information and belief, the applicant and its attorneys/patent agents, including John N. Anastasi, Marcus Browne, Matthew Grady, and/or Gregory K. Gerstenzang, were aware that the patents were being reviewed by separate examiners, and that a disclosure of Oh WO in an IDS to the examiner of the '640 patent would not disclose Oh WO to the '331 and '995 patent examiner.

35. On information and belief, Oh WO was material prior art to the '331 and '995



patents.

36. For example, Oh WO was cited by the European Patent Office (“EPO”) in a supplementary European search report dated March 25, 2015. The search report describes Oh WO as among the “documents considered to be relevant” and classified it as an “X” reference, meaning that it is “particularly relevant if taken alone.” This search report was cited in the September 2015 IDS where Oh WO was disclosed to the Patent Office in connection with the ’640 patent. The IDS described the European patent application as “corresponding” to the ’640 patent, thus reflecting that Oh WO would be “particularly relevant” to the ’640 patent’s validity as well. Marcie Black was a named inventor on the EPO application as well as the ’331, ’640, and ’995 patents.

37. The EPO’s corresponding search opinion concluded, among other things, that Oh WO “is prejudicial to the novelty of the subject-matter of independent claim 11 of the present application.” The EPO application was subsequently deemed to be withdrawn.

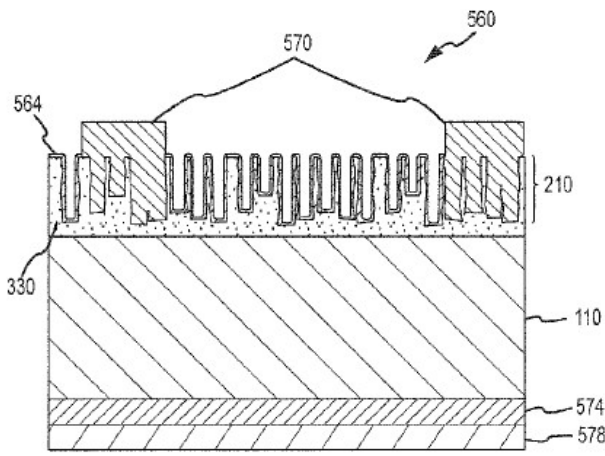
38. On information and belief, the EPO’s search opinion provided further knowledge that Oh WO was material to the patentability of the ’331 and ’995 patents to the applicant and its attorneys/patent agents, including Marcie Black, John N. Anastasi, Marcus Browne, Gregory K. Gerstenzang, and/or Matthew Grady.

39. On information and belief, the applicant and its attorneys involved in prosecution, including at least Marcie Black, John N. Anastasi, Gregory K. Gerstenzang, Marcus E. Browne, and/or Matthew Grady, were aware of the EPO’s search opinion as evidenced by identification of the report in an IDS submitted in connection with the ’640 patent prosecution.

40. The ’640 patent also has similarities in subject matter with the ’331 and ’995 patents. For example, both patents have independent claims involving a “substrate,” a “nanostructured area,” a “passivating layer” or “electrically insulating layer,” “contacts” or a

“conductor,” and various requirements as to how these features are arranged relative to one another. See ’640 patent cl. 1, 14; ’331 patent cl. 1; ’995 patent cl. 1, 11.

41. Below is a table illustrating how the EPO’s analysis in its search report would have informed the recipient of the materiality of Oh WO to the ’331 and ’995 patents. For purposes of materiality, Hanwha interprets the claims as ASGT appears to for its infringement allegations. Nothing in this table or elsewhere should be taken as admissions or contentions by Hanwha as to how the claims should be properly construed:

'331 Patent	Oh WO and EPO Search Opinion
<p>1. A silicon nanostructured device comprising:</p>	<p>The EPO’s search opinion states: “This earlier application shows an optoelectronic device (see abstract and Fig. 5) comprising (a) a substrate (see Fig. 5, reference 110), (b) a nanostructured area on a first surface of the substrate (see Fig. 5 and line 3 of paragraph 37) . . . .”</p> <p>Oh WO’s Abstract states: “A photovoltaic (PV) device with improved blue response. . . . Anti-reflection in the PV device is provided solely by a nanostructured or black silicon surface on the light-receiving surface, through which the emitter is formed by diffusion.”</p>  <p style="text-align: center;">FIG.5</p>
<p>[1-a] a non-nanostructured substrate;</p>	<p>The EPO’s search opinion states: “This earlier application shows an optoelectronic device (see abstract and Fig. 5) comprising (a) a substrate (see Fig. 5, reference 110), (b) a nanostructured area on a first surface of the substrate (see Fig. 5 and line 3 of paragraph 37) . . . .”</p>

As ASGT appears to interpret the claims for infringement, "substrate" 110 is a non-nanostructured substrate.

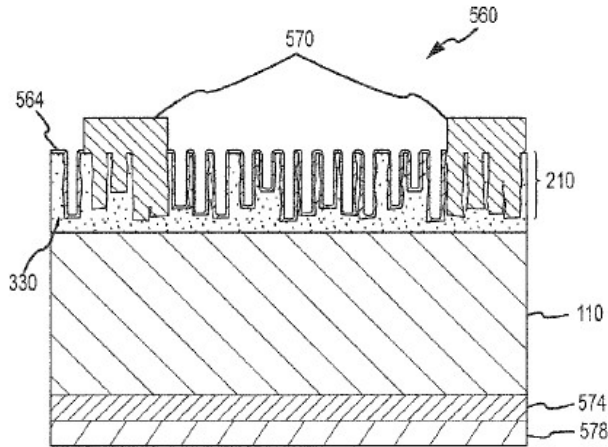


FIG.5

[1-b] a nanostructured area disposed on and contacting a surface of the substrate;

The EPO's search opinion states: "This earlier application shows an optoelectronic device (see abstract and Fig. 5) comprising (a) a substrate (see Fig. 5, reference 110), (b) a nanostructured area on a first surface of the substrate (see Fig. 5 and line 3 of paragraph 37) . . ."

As ASGT appears to interpret the claims for infringement, "substrate" 110 is a non-nanostructured substrate.

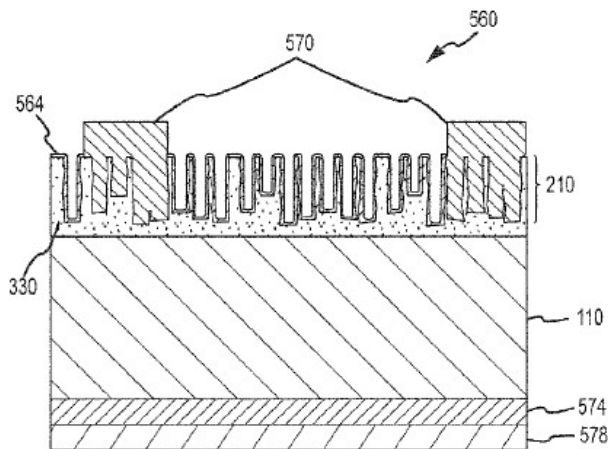
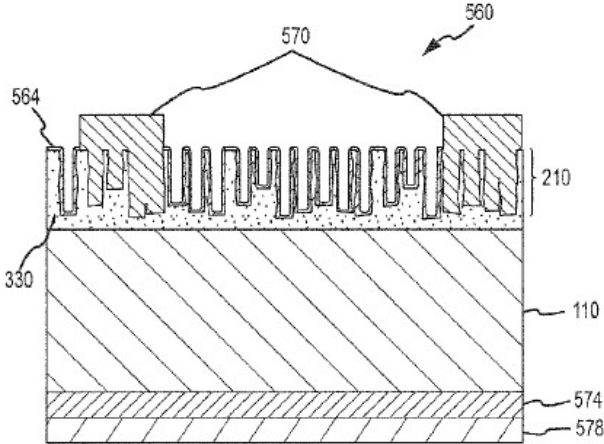


FIG.5

[1-c] a passivating layer coating

The EPO's search opinion states: "This earlier application shows an optoelectronic device (see abstract and Fig. 5) comprising (a) a substrate (see Fig. 5, reference 110), (b) a nanostructured area on a first surface of the

<p>the nanostructured area,</p>	<p>substrate (see Fig. 5 and line 3 of paragraph 37), (c) an insulating layer atop the first surface (see Fig. 5, reference 564 and lines 2-4 of paragraph 54) . . . .”</p> <p>As ASGT appears to interpret the claims for infringement, “passivation layer or coating 564” is a passivating layer coating a nanostructured area.</p>  <p style="text-align: center;"><b>FIG.5</b></p> <p>[0054] “Figure 5 illustrates a PV device 560 in the form of a solar cell that has been fabricated with the wafer/substrate device 450 of Figure 4. As shown, a <b>passivation layer or coating 564 has been formed</b> over the black silicon layer 210, and this layer 564 may be a thermal oxide layer as noted above.”</p>
<p>[1-d] the passivating layer comprising one of aluminum oxide, silicon dioxide, or silicon nitride,</p>	<p>See element [1-c].</p> <p>Oh WO further states:</p> <p>[0052] “In other cases, another form of passivation is provided on the surfaces of the black silicon layer 210 for example with <b>Al<sub>2</sub>O<sub>3</sub></b> (e.g., deposited by atomic layer deposition) or hydrogenated amorphous silicon or <b>silicon nitride</b> or with organic molecules that reduce surface recombination velocity.”</p> <p>[0063] “At step 670, the method 600 continues with passivating the black silicon surface (or the light- receiving surface of the PV device). This may involve thermally growing at a higher temperature (e.g., at about 850 °C) a <b>thin layer of silicon dioxide (SiO<sub>2</sub>) to passivate</b> the black silicon.”</p>

[1-e] one or more contacts comprising a comb-like pattern of metal directly contacting the nanostructured area; and

The EPO's search opinion states: "This earlier application shows an optoelectronic device (see abstract and Fig. 5) comprising (a) a substrate (see Fig. 5, reference 110), (b) a nanostructured area on a first surface of the substrate (see Fig. 5 and line 3 of paragraph 37), (c) an insulating layer atop the first surface (see Fig. 5, reference 564 and lines 2-4 of paragraph 54), (d) a segment of the nanostructured area where the nanostructures are at least partially broken or removed (see Fig. 3-4 and page 12, paragraph 42 and particularly the statement "The processing has also caused the removal of the silicon separating some tunnels/pores 212, which enlarges the tunnels/pores and increases 002': it can be clearly seen from Fig. 4 that a segment of the nanostructured area (at the left-part of the wafer) has been removed), (f) a conductor atop the insulating layer and optional covering layer (see page 17, paragraph 54 and particularly the statement "These contacts 570 may also be made by screen printing a meta/containing paste that can penetrate the oxide or other passivating layer 564 to contact the emitter layer 330."

As ASGT appears to interpret the claims for infringement, the front contact grid 570 constitutes one or more contacts comprising a comb-like pattern of metal directly contacting a nanostructured area.

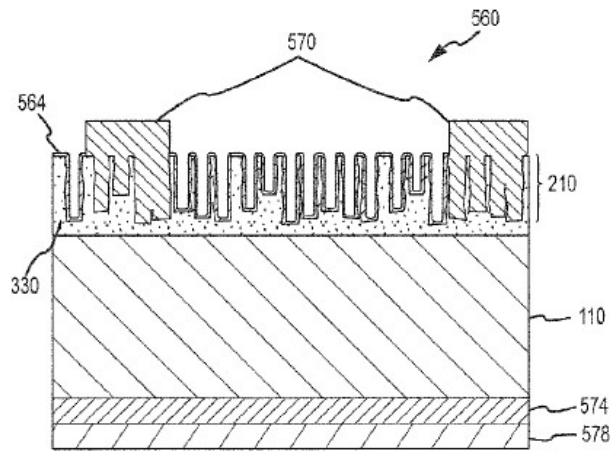
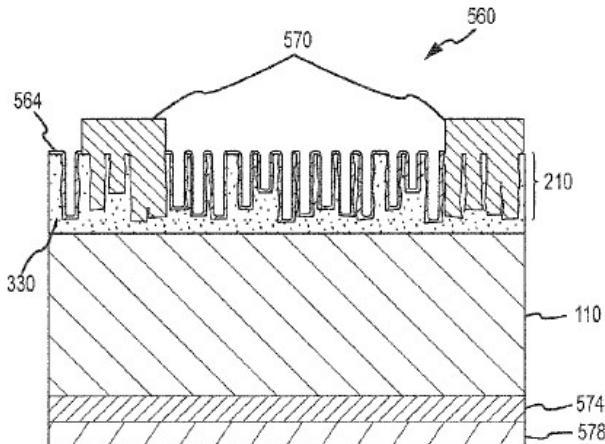


FIG.5

Oh WO further states:

[0055] "Next, a front contract grid 570 may be formed such as by opening an array of slits in the passivating oxide on the front or textured surface side of the wafer/substrate and then covering these slits with Ti or the like such as by vacuum evaporation and lift-off of photoresist. The solar cell 560 may be further processed or be assembled with other cells to make solar modules, which in turn may be linked to form photovoltaic arrays. Of course, this is just one simplified method of fabricating a solar cell, and other techniques may be used to form a solar cell or other PV devices (such as a detector) that includes the wafer/device 450 of Figure 4."

<p>a p-n junction below the nanostructured area.</p>	<p>The EPO's search opinion repeatedly references Figure 5 of Oh WO. A p-n junction is formed where Figure 5 shows 330 meeting 100. As ASGT appears to interpret the claims for infringement, the junction is below a nanostructured area.</p>  <p style="text-align: center;">FIG.5</p>
--	--

42. Claim 1 of the '995 patent has substantial overlap with claim 1 of the '331 patent. The table above addresses the following elements of '995 patent claim 1: “A silicon nanostructured device comprising: a non-nanostructured substrate; a nanostructured area disposed on and contacting a surface of the substrate; a passivating layer coating the nanostructured area, the passivating layer comprising one of aluminum oxide, silicon dioxide, or silicon nitride; a first contact comprising a comb-like pattern of metal directly contacting the nanostructured area; a p-n junction below the nanostructured area.”

43. Claim 1 of the '995 patent further requires: “a second metal contact in electrical contact with the substrate.” Oh WO discloses a “back contact layer 578” that can be made of aluminum. Oh WO ¶ [0054]. Back contact layer 578 is shown in Figure 5 of Oh WO and discussed in ¶ 54, both of which were cited by the EPO in its search opinion.

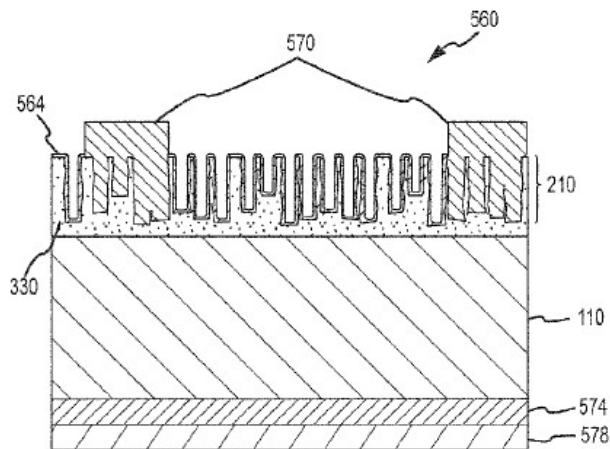


FIG.5

Oh WO Fig. 5

44. The evidence above also addresses all elements of '995 claim 11.

45. Thus, the EPO's identification of Oh WO as "particularly relevant" to the validity of an application that, in the applicant's words, "correspond[ed]" to the '640 patent, and its discussion of the disclosures of Oh WO, evidences that the applicant and attorneys/patent agents at Lando & Anastasi, including at least Marcie Black, John N. Anastasi, Marcus Browne, Matthew Grady, and/or Gregory K. Gerstenzang, were aware that Oh WO was material prior art to the '331 and '995 patents, and made a deliberate decision not to disclose it to the Patent Office.

46. The Patent Office would not have allowed at least one claim each from the '331 and '995 patents to issue had it been aware of Oh Wo, at least because it would have found a claim anticipated or obvious over that art, as shown by the discussion above.

47. Oh WO is not cumulative of other art or information before the examiner of the '331 and '995 patents. During prosecution of the '331 patent, the primary reference relied on by the examiner was U.S. Patent Pub. No. 2006/0207647 to Tsakalacos. The examiner concluded that Tsakalacos did not anticipate the issued claims. His reasoning included that "[a]ccording to

Tsakalakos, the p-n junction is formed between the upper and lower segments of the nanowire” and therefore would not meet the limitation “a p-n junction below the nanostructured area.” This argument had been urged by the applicant in an office action response submitted by the Lando & Anastasi, LLP firm signed by Gregory Gerstenzang and also listing John Anastasi on the signature block. The ’995 patent is a continuation of the ’331 patent with similar independent claims, and the prior art presented during prosecution of the ’995 patent generally overlaps with what was presented during prosecution of the ’331 patent.

48. Oh WO, in contrast, discloses forming a p-n junction that is not in the middle of a nanowire. In Figure 5 of Oh WO below, for example, the p-n junction can be formed where 110 meets 330. As ASGT appears to interpret the claims for infringement, this discloses “a p-n junction below the nanostructured area.” On information and belief, the applicant and its attorneys/patent agents, including Marcie Black and those at the Lando & Anastasi, LLP firm such as Mr. Gerstenzang and Mr. Anastasi, knew that Oh contained this disclosure and withheld it from the Patent Office during prosecution of the ’331 and ’995 patents.

49. In sum, even though the same applicant, the same law firm, and overlapping lawyers/patent agents were prosecuting all three applications, which named nearly all the same inventors and had similarities in subject matter, and even though Oh WO was disclosed in connection with the ’640 patent after being identified by the EPO as “particularly relevant” and a search opinion read Oh WO onto an independent claim of a corresponding application to the ’640 patent, no IDS disclosing Oh WO was ever submitted to the Patent Office during prosecution of the ’331 and ’995 patents. On information and belief, the examiner of the ’331 and ’995 patents was unaware of Oh WO.

50. On information and belief, the applicant and its attorneys involved in prosecution,



including at least Marcie Black, John N. Anastasi, Gregory K. Gerstenzang, Marcus E. Browne, and/or Matthew Grady, specifically intended to deceive the Patent Office into believing that the claims of the '331 and '995 patents were patentable, by withholding Oh WO from the examiner during prosecution of the '331 and '995 patents.

51. ***Inequitable Conduct Defense:*** Any one or more acts set forth above are sufficient in and of itself/themselves to demonstrate inequitable conduct during the prosecution of the '331 and '995 patents that renders the asserted claims of those patents unenforceable.

52. ***Unclean Hands Defense:*** Furthermore, any one or more acts set forth above are sufficient in and of itself/themselves demonstrated that ASGT has unclean hands in relation to its assertion of the '331 and '995 patents that render the asserted claims of those patents unenforceable.

**FOURTEENTH AFFIRMATIVE DEFENSE  
(Claim Construction Estoppel)**

53. On information and belief, representations, omissions, and/or concessions made during prosecution of the Asserted Patents, and/or related U.S. or foreign patents and patent applications, limit the scope of the claims of the Asserted Patents such that ASGT is estopped from construing the claims of the Asserted Patents to cover any Accused Product.

**FIFTEENTH AFFIRMATIVE DEFENSE  
(Standing)**

54. On information and belief, ASGT lacks standing to pursue any claim for relief alleged in the Complaint because ASGT is not the sole and rightful owner of the Asserted Patents.

**SIXTEENTH AFFIRMATIVE DEFENSE  
(Other Defenses)**

55. Hanwha reserves the right to amend its Response to include other additional defenses that Hanwha may learn of during the course of this investigation.

### **HANWHA'S PRAYER FOR RELIEF**

56. WHEREFORE, Hanwha requests that the Commission issue an order:
57. Denying all relief against Hanwha requested in the Complaint;
58. Finding that Hanwha has not violated Section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337;
59. Finding that Hanwha has not directly infringed, contributorily infringed, and/or induced infringement of any of the asserted claims of the Asserted Patents;
60. Finding that the Asserted Claims of the Asserted Patents are invalid and/or unenforceable;
61. Finding that there is no domestic industry for any of the Asserted Patents;
62. Awarding Hanwha its attorneys' fees and costs incurred in responding to the Complaint and defending themselves in this investigation;
63. Finding that it is not in the public interest to grant any relief to Complainant;
64. Dismissing the present Complaint and terminating the present investigation; and
65. Awarding such other and further relief as the Commission deems just and proper.

### **RESPONSE TO THE NOTICE OF INVESTIGATION**

66. Hanwha acknowledges that the Commission has instituted an investigation as set forth in the Commission's Notice of Investigation, dated July 14, 2021, and published in the Federal Register on July 20, 2021. Hanwha denies that it is in violation of 19 U.S.C. § 1337 and that it has engaged in the unlawful importation into the United States, the sale for importation, or the sale within the United States after importation of certain silicon photovoltaic cells and modules with nanostructures, and products containing the same, that infringe the Asserted Claims of the Asserted Patents.

67. Hanwha admits that, as set forth in the Summary in the Commission's Notice of

Investigation, the Complaint alleges that an industry in the United States exists or is in the process of being established, but Hanwha lacks sufficient information and knowledge to form a belief as to the truth of ASGT's allegation that it meets the domestic industry requirement, and Hanwha denies such allegations on that basis.

68. Hanwha denies that ASGT is entitled to, or that the Commission should issue, any kind of exclusion order, cease and desist order, or any other form of relief based on the allegations set forth in the Complaint.

**STATEMENT PURSUANT TO COMMISSION RULE 210.13(b)**

69. Pursuant to Commission Rule 210.13(b), Hanwha provides the following information with the sole intention of supplying statistical and other data required by the rule. Hanwha specifically denies that any of the information or data relate to or support any allegations of infringement against Hanwha or any unlawful act under Section 337 or otherwise. As detailed above, Hanwha also denies that Hanwha Q CELLS & Advanced Materials Corp.; Hanwha Q Cells GmbH; Hanwha Q Cells (Qidong) Co., Ltd.; Hanwha Energy USA Holdings Corp. (d/b/a 174 Power Global Corporation); Hanwha Q Cells USA Corp.; HQC Rock River Solar Holdings LLC; and HQC Rock River Solar Power Generation Station, LLC are involved in importing, selling for importation, or selling within the United States after importation any of the accused Hanwha products.

70. The approximate statistical data related to quantity and value of imports of the accused Hanwha products, based on Hanwha's present understanding of the accused Hanwha products, is set forth in **Confidential Appendix B**.

71. Based on Hanwha's present understanding of the accused Hanwha products, Hanwha states that the accused Hanwha products may fall within the following classifications of the Harmonized Tariff Schedules of the United States: 8541.40.6015, 8541.40.6025.

72. **Confidential Appendix B** also sets forth Hanwha's statement on manufacturing capacity.

73. The United States market is significant to Hanwha's operations.

Date: August 18, 2021

Respectfully submitted,

By: /s/ S. Alex Lasher

S. Alex Lasher  
Jeffrey S. Gerchick  
K. Kevin Chu  
Courtney S. Kasuboski  
QUINN EMANUEL URQUHART &  
SULLIVAN, LLP  
1300 I Street, NW, Suite 900  
Washington, D.C. 20005  
Tel.: (202) 538-8000  
Fax: (202) 538-8100

Sean S. Pak  
QUINN EMANUEL URQUHART  
& SULLIVAN, LLP  
50 California St., 22nd Floor  
San Francisco, CA 94111  
Tel.: (415) 875-6600  
Fax: (415) 875-6700

David Nelson  
QUINN EMANUEL URQUHART &  
SULLIVAN, LLP  
191 N Upper Wacker Dr #2700  
Chicago, IL 60606  
Tel.: (312) 705-7400  
Fax: (312) 705-7401

D. James Pak  
QUINN EMANUEL URQUHART  
& SULLIVAN, LLP  
865 S. Figueroa St., 10th Floor  
Los Angeles, CA 90017  
Tel.: (213) 443-3000  
Fax: (213) 443-3100

Sean Gloth  
QUINN EMANUEL URQUHART  
& SULLIVAN, LLP  
51 Madison Ave., 22nd Floor  
New York, NY 10010  
Tel.: (202) 849-7000  
Fax: (202) 849-7100

*Counsel for Respondents  
Hanwha Q Cells & Advanced Materials  
Corp.; Hanwha Q Cells GmbH; Hanwha Q  
Cells Malaysia Sdn. Bhd.; Hanwha Q Cells  
(Qidong) Co., Ltd.; Hanwha Solutions  
Corporation; Hanwha Energy USA Holdings  
Corp. (d/b/a 174 Power Global Corporation);  
Hanwha Q Cells EPC USA LLC; Hanwha Q  
Cells America Inc.; Hanwha Q Cells USA  
Corp.; Hanwha Q Cells USA Inc.; HQC Rock  
River Solar Holdings LLC; and HQC Rock  
River Solar Power Generation Station, LLC*

# **APPENDIX A**

**UNITED STATES INTERNATIONAL TRADE COMMISSION  
Washington, DC**

**Before The Honorable David P. Shaw  
Administrative Law Judge**

**In the Matter of**

**CERTAIN SILICON PHOTOVOLTAIC  
CELLS AND MODULES WITH  
NANOSTRUCTURES, AND PRODUCTS  
CONTAINING THE SAME**

**Inv. No. 337-TA-1271**

**APPENDIX A TO HANWHA RESPONDENTS' RESPONSE TO  
THE COMPLAINT AND NOTICE OF INVESTIGATION**

**I. PRIOR ART FOR U.S. PATENT NO. 8,450,599**

**A. U.S. Issued Patents & Patent Applications**

<b>Patent / Publ. Number</b>	<b>Issue / Publication Date</b>	<b>Named Inventors</b>
5,178,685	1/1993	Borenstein et al.
6,649,824	11/2003	Den et al.
2006/0207647	9/2006	Tsakalagos et al.
2007/O107103	5/2007	Kempa et al.
2007/0278476 A1	12/2007	Black
2007/0289623 A1	12/2007	Atwater
2008.OOO6319 A1	1/2008	Bettge et al.
2008/O169017 A1	7/2008	Korevaar et al.

**B. Foreign Issued Patents & Patent Applications**

<b>Patent / Publ. Number</b>	<b>Issue / Publication Date</b>
CN 1693191	11/2005
JP 2005-059125 A	3/2005
KR 10-0809248 B1	2/2008
WO-2010/056352	5/2010

**C. Non-Patent Publications**

<b>Description</b>
Erik C. Garnett, Peidong Yang, J. Am. Chem. Soc. 130 (29) (2008) 9224-9225.
Brendan M. Kayes, Harry A. Atwater, Nathan S. Lewis, J. of App. Phy. 97 (11) 2005, 114302.
G. Goncher, R. Solanki, J.R. Carruthers, J. Conley Jr., Y. Ono, J. Electr. Mat. 35 (7) (2006) 1509-1512.



<b>Description</b>
T. Heidel, J. Mapel, M. Singh, K. Celebi, M. Baldo, Apl.91 093506 (2007).
M. Kirkengen, J. Bergli, Y. Galperin, J. Appl. Phys. 102 (9) (2007) O93713.
C. Hagglund, M. Zach, B. Kasemo, Apl 92(1)013113 (2008).
U.S. Appl. No. 61/195,872, Oct. 9, 2008, Buchine et al.
U.S. Appl. No. 61/114,896, Nov. 14, 2008, Buchine et al.
U.S. Appl. No. 61/141,082, Dec. 29, 2008, Buchine et al.
U.S. Appl. No. 61/142,608, Jan. 5, 2009, Buchine et al.
S. Koynov, M.S. Brandt, M. Stutzman, "Black nonreflecting silicon surfaces for solar cells." Applied Physics Letters, 88, 203107 (2006).
K. Peng, Y. Xu, Y. Wu, Y. Yan, S. Lee, J. Zhu, "Aligned Single-Crystalline Si Nanowire Arrays for Photovoltaic Applications." Small, 2005 1 (11), 1062-1067.
Black et al., "Optical Properties of Bismuth Nanowires." Encyclopedia of Nanoscience and Nanotechnology, 2011, vol. 10, pp. 225-242.
Franssila, "Introduction to Microfabrication." 2004, John Wiley & Sons Ltd., ISBN 978-0-470-85105-0, 391 pages.
Gray, "Chapter 3. The Physics of the Solar Cell." Handbook of Photovoltaic Science and Engineering, 2003, pp. 61-112.
Green, "Chapter 10. Silicon Solar Cells, Advanced Principles & Practice." Centre for Photovoltaic Devices and Systems, Mar. 1995, ISBN 0733409946, 35 pages.
Kuiqing Peng et al., "Fabrication of Single-Crystalline Silicon Nanowires by Scratching a Silicon Surface with Catalytic Metal Particles." Advanced Functional Materials, 2006, 16, pp. 387-394.
Olson et al., "Chapter 9. High-Efficiency III-V Multijunction Solar Cells." Handbook of Photovoltaic Science and Engineering, 2003, pp. 359-411.

## II. PRIOR ART FOR U.S. PATENT NO. 8,852,981

### A. U.S. Issued Patents & Patent Applications

<b>Patent / Publ. Number</b>	<b>Issue / Publication Date</b>	<b>Named Inventors</b>
4,726,850	2/1998	Wenham et al.
6,986,838	1/2006	Babic et al.
7,691,720	4/2010	Furukawa et al.
8,617,970	12/2013	Koto et al.
2005/0117194	6/2005	Kim et al.
2006/0207647	9/2006	Tsakalagos et al.
2007/0278476	12/2007	Black
2008/0210937	9/2008	Kobayashi et al.
2008/0296551	12/2008	Nihei et al.
2009/0256134	10/2009	Buchine et al.
2010/0045160	2/2010	Dayton et al.
2010/0092888	4/2010	Buchine et al.
2012/O181502	7/2012	Modawar et al.

## B. Non-Patent Publications

Description
I. Tobias, C. del Cañizo, J. Alonso, "Crystalline silicon solar cells and modules." Chapter 7 in A. Luque, Handbook of Photovoltaic Science and Engineering (John Wiley & Sons 2003).
K. Kang, W. Cai, "Size and temperature effects on the fracture mechanisms of silicon nanowires: Molecular dynamics simulations." International Journal of Plasticity 26, 1387-1401 (2010).
B.A. Gozen O.B. Ozdoganlar, "A Rotating-Tip-Based Mechanical Nano-Manufacturing Process: Nanomilling." Nanoscale Research 2008/0296551 Letters 5, 1403-1407 (2010).
International Search and Patentability Report for PCT counterpart of present application.

## III. PRIOR ART FOR U.S. PATENT NO. 9,601,640

### A. U.S. Issued Patents & Patent Applications

Patent / Publ. Number	Issue / Publication Date	Named Inventors
4,726,850	2/1998	Wenham et al.
6,986,838	1/2006	Babic et al.
7,691,720	4/2010	Furukawa et al.
8,486,287	7/2013	Zhu
8,617,970	12/2013	Koto
2005/0117194	6/2005	Kim et al.
2006/0207647	9/2006	Tsakalagos
2007/0278476	12/2007	Black
2008/0210937	9/2008	Kobayashi
2008/O296551	12/2008	Nihei et al.
2009/0217972	9/2009	Guha et al.
2009/0256134	10/2009	Buchine et al.
2010/0045160	2/2010	Dayton, Jr.
2010/0092888	4/2010	Buchine et al.
2012/0181502	7/2012	Modawar et al.

### B. Foreign Issued Patents & Patent Applications

Patent / Publ. Number	Issue / Publication Date
WO 2010150947 A1	12/2010
WO 2012121706 A1	9/2012

### C. Non-Patent Publications

Description
B.A. Gozen O.B. Ozdoganlar, "A Rotating-Tip-Based Mechanical Nano-Manufacturing Process: Nanomilling." Nanoscale Research Letters 5, 1403-1407 (2010).
Byung Oh Jung et al.: "Fully transparent vertically aligned ZnO nanostructure-based ultraviolet photodetectors with high responsivity", Sensors and Actuators B: Chemical:

<b>Description</b>
International Journal Devoted to Research and Development of Physical and Chemical Transducers, Elsevier S.A, CH, vol. 160, No. 1, Aug. 18, 2011 (Aug. 18, 2011), pp. 740-746.
I. Tobias, C. del Caiiizo, J. Alonso, "Crystalline silicon solar cells and modules," Chapter 7 in A. Luque, Handbook of Photovoltaic Science and Engineering (John Wiley & Sons 2003).
International Search and Patentability Report for PCT counterpart of present application.
K. Kang, W. Cai, "Size and temperature effects on the fracture mechanisms of silicon nanowires: Molecular dynamics simulations." International Journal of Plasticity 26, 1387-1401 (2010).
European Search Report from corresponding EP Application Serial No. 12833982.7 dated Apr. 7, 2015.

#### **IV. PRIOR ART FOR U.S. PATENT NO. 9,768,331**

##### **A. U.S. Issued Patents & Patent Applications**

<b>Patent / Publ. Number</b>	<b>Issue / Publication Date</b>	<b>Named Inventors</b>
2006/0207647	9/2006	Tsakalagos
2008/0006319	1/2008	Bettge
2009/0256134	10/2009	Buchine et al.
2011/0114179	5/2011	Funakoshi
2011/0136288	6/2011	Duane et al.
2011/0155229	6/2011	Lam
2011/0277825	11/2011	Fu
2013/0099345	4/2013	Black et al.

##### **B. Foreign Issued Patents & Patent Applications**

<b>Patent / Publ. Number</b>	<b>Issue / Publication Date</b>
CN 102227002	10/2011
WO 2011029640	3/2011

##### **C. Non-Patent Publications**

<b>Description</b>
I. Tobias, C. del Canizo, J. Alonso, "Crystalline silicon solar cells and modules," Chapter 7 in A. Luque, Handbook of Photovoltaic Science and Engineering (John Wiley & Sons 2003).
K. Kang, W. Cai, "Size and temperature effects on the fracture mechanisms of silicon nanowires: Molecular dynamics simulations," International Journal of Plasticity 26, 1387-1401 (2010).
B. A. Gozen and O.B. Ozdoganlar, "A Rotating-Tip-Based Mechanical Nano-Manufacturing Process: Nanomilling," Nanoscale Research Letters 5 , 1403-1407 (2010).
M.M. Hilali, A. Rohatgi, and B. To, "A Review and Understanding of Screen-Printed Contacts and Selective-Emitter Formation," 14 <sup>th</sup> Workshop on Crystalline Silicon Solar Cells and Modules, Winter Park, Colorado, Aug. 8-11, 2004.

Description
Dirk-Holger Neuhaus and Adolf Münzer, Advances in Opto Electronics , vol. 2007, Article ID 24521 .
International Search Report for WO2013/123066.
English language abstract for CN102227002, downloaded Aug . 30 , 2014 from Espacenet .

## V. PRIOR ART FOR U.S. PATENT NO. 10,269,995

### A. U.S. Issued Patents & Patent Applications

Patent / Publ. Number	Issue / Publication Date	Named Inventors
5,034,068	7/1991	Glenn
2006/0207647	9/2006	Tsakalagos et al.
2008/0006319	1/2008	Bettge et al.
2009/0256134	10/2009	Buchine et al.
2011/0114179	5/2011	Funakoshi
2011/0136288	6/2011	Duane et al.
2011/0155229	6/2011	Lam et al.
2011/0277825	11/2011	Fu et al.
2013/0099345	4/2013	Black et al.

### B. Foreign Issued Patents & Patent Applications

Patent / Publ. Number	Issue / Publication Date
CN 102227002A	10/2011
WO 2011029640	3/2011

### C. Non-Patent Publications

Description
Koynov et al., “Black multi-crystalline silicon solar cells”, Phys. Stat. Sol. (RRL), 1, No. 2, R53-R55 (2007).

## VI. PRIOR ART FOR U.S. PATENT NO. 10,692,971

### A. U.S. Issued Patents & Patent Applications

Patent / Publ. Number	Issue / Publication Date	Named Inventors
4,540,843	9/1985	Gochermann et al.
4,589,191	5/1986	Green et al.
5,178,685	1/1993	Borenstein et al.
5,221,854	6/1993	Banerjee et al.
6,063,695	5/2000	Lin et al.
6,177,291	1/2001	Eriguchi et al.
6,334,939	1/2002	Zhou et al.
6,514,395	2/2003	Zhou et al.

Patent / Publ. Number	Issue / Publication Date	Named Inventors
6,534,336	3/2003	Iwane et al.
6,649,824	11/2003	Den et al.
7,265,037	9/2007	Yang et al.
7,273,732	9/2007	Pan et al.
7,816,031	10/2010	Cui et al.
8,143,143	3/2012	Buchine et al.
8,450,599	5/2013	Buchine et al.
8,491,718	7/2013	Chaudhari
8,791,449	7/2014	Buchine et al.
9,202,868	12/2015	Buchine et al.
2002/0079290	6/2002	Holdermann
2003/0178057	9/2003	Fujii et al.
2004/0005723	1/2004	Empedocles et al.
2004/0245912	12/2004	Thurk et al.
2005/0074917	4/2005	Mason et al.
2005/0200020	9/2005	Kamins
2006/0101944	5/2006	Petrini et al.
2006/0207647	9/2006	Tsakalagos et al.
2006/0216603	9/2006	Choi
2007/0107103	5/2007	Kempa et al.
2007/0148975	6/2007	Mascolo et al.
2007/0190542	8/2007	Ling et al.
2007/0278476	12/2007	Black
2007/0289623	12/2007	Atwater
2008/0006319	1/2008	Bettge et al.
2008/0038467	2/2008	Jagannathan et al.
2008/0169017	7/2008	Korevaar et al.
2010/0092888	4/2010	Buchine et al.
2010/0122725	5/2010	Buchine et al.

### B. Foreign Issued Patents & Patent Applications

Patent / Publ. Number	Issue / Publication Date
CN 163191A	11/2005
EP 0039020A2	11/1981
JP 2005059125A	3/2005
KR 100809248B1	2/2008
WO 2008047847A1	4/2008
WO 2010056352A2	5/2010

### C. Non-Patent Publications

Description
A. Luque, A. Marti, "Increasing the Efficiency of Ideal Solar Cells by Photon Induced Transitions at Intermediate Levels," Phys. Rev. Lett. 78 (26) (1997) 5014-5017.

<b>Description</b>
C. Chan et al., "High-performance lithium battery anodes using silicon nanowires," <i>Nature Nanotechnology</i> 3, 31-35 (2008).
Candace K. Chan et al., "Structural and electrochemical study of the reaction of lithium with silicon nanowires," <i>Journal of Power Sources</i> 189, 34-39 (2009).
H. Asoh, F. Arai, S. Ono, "Site-selective chemical etching of silicon using patterned silver catalyst," <i>Electrochem. Comm.</i> 9 (2007) 535.
H. Fang, Y. Wu, J. Zhao, and J. Zhu, "Silver catalysis in the fabrication of silicon nanowire arrays," <i>Nanotechnology</i> 17 (2006) 3768.
K. Peng, J. Hu, Y. Yan, Y. Wu, H. Fang, Y. Xu, S. Lee, and J. Zhu, "Fabrication of Single-Crystalline Silicon Nanowires by Scratching a Silicon Surface with Catalytic Metal Particles." <i>Adv. Funct. Mat.</i> 16 (2006) 387.
K. Peng, J. Jie, W. Zhang, S. Lee, "Silicon nanowires for rechargeable lithium-ion battery anodes." <i>App. Phys. Lett.</i> , 93, 033105 (2008).
K. Peng , M. Zhang , A. Lu , N. Wong , R. Zhang , S. Lee, "Ordered silicon nanowire arrays via nanosphere lithography and metal induced etching." <i>App. Phys. Lett.</i> 90 (2007) 163123.
K. Peng, Y. Xu, Y. Wu, Y. Yan, S. Lee, J. Zhu, "Aligned Single Crystalline Si Nanowire Arrays for Photovoltaic Applications," <i>Small</i> , 1 (11) (2005) 1062-1067.
K. Peng, Z. Huang, and J. Zhu, "Fabrication of Large Area Silicon Nanowire p-n Junction Arrays." <i>Adv. Mater.</i> 16 (1) (2004) 73-76.
Koynov et al., "Black multi-crystalline silicon solar cells", <i>Phys. Stat. Sol. (RRL)</i> , 1, No. 2, R53-R55 (2007).
Koynov et al., "Black nonreflecting silicon surfaces for solar cells", <i>Applied Physics Letters</i> , 88, 203107 (2006).
L. Tsakalakos, J. Balch, J. Fronheiser et al. "Silicon nanowire solar cells," <i>App. Phys. Lett.</i> 91 (23) (2007) 233117.
Li-Feng Cui et al., "Crystalline-Amorphous Core-Shell Silicon Nanowires for High Capacity and High Current Battery Electrodes," <i>Nano Letters</i> 9, 491-495 (2009).
M. D. Kelzenberg, D. B. Turner-Evans , B. M. Kayes et al., "Photovoltaic Measurements in Single-Nanowire Silicon Solar Cells." <i>Nano Lett.</i> 8 (2) (2008) 710-714.
Q. Shao, A. A. Balandin et al., "Intermediate-band solar cells based on quantum dot supracrystals." <i>App. Phys. Lett.</i> 91 (2007) 163503.
S. Panero, B. Scrosati, M. Wachtler et al., "Nanotechnology for the progress of lithium batteries R & D." <i>J. of Power Sources</i> 129 (2004) 90-95 .
T. Qiu, X. L. Wu, X. Yang, G. S. Huang, and Z. Y. Zhang, "Self-assembled growth and optical emission of silver-capped silicon nanowires." <i>App. Phys. Lett.</i> , 84 (19) (2004) 3867.
T.L. Kulova et al., "The Li Insertion / Extraction Characteristics of Amorphous Silicon Thin Films," <i>Chem. Biochem. Engl. Q.</i> 21, 83-92 (2007).
Uday Kassavajjula et al., "Nano-and bulk-silicon-based insertion anodes for lithium-ion secondary cells," <i>Journal of Power Sources</i> 163, 1003-1039 (2007).
Y. Cui et al., "Diameter-controlled synthesis of single-crystal silicon nanowires." <i>App. Phys. Lett.</i> 78 (2001) 2214-2216.
Y. Yang, P. Chu, Z. Wu, S. Pu, T. Hung, K. Huo, G. Qian, W. Zhang, X. Wu, "Catalysis of dispersed silver particles on directional etching of silicon," <i>Appl. Surf. Sci</i> 254 (2008) 3061.
Z. Huang et al. Fabrication of Silicon Nanowire Arrays with Controlled Diameter, Length, and Density; <i>Adv. Mater.</i> 2007, 19, 744-748; Published online: Feb. 7, 2007.

<b>Description</b>
Z. Huang, J. Carey, M. Liu, X. Guo, E. Mazur, J. Campbell, "Microstructured silicon photodetector", <i>Appl. Phys. Lett.</i> 89,033506 (2006).
Black et al., "Optical Properties of Bismuth Nanowires," <i>Encyclopedia of Nanoscience and Nanotechnology</i> , 2011, vol. 10, pp. 225-242.
Chaudhari, P. et al., Heteroepitaxial Silicon Film Growth at 600C From an Al-Si Eutectic Melt, pp. 5368-5371, Mar. 19, 2010, <i>Thin Solid Films</i> 518, Elsevier, US.
Examination Report from corresponding Indian Application No. 3312 / CHENP / 2011 dated Apr. 11, 2018.
Extended European Search Report for Corresponding Application.: EP09826444 dated Apr. 11, 2016.
Franssila, "Introduction to Microfabrication," 2004, John Wiley & Sons Ltd., ISBN 978-0-470-85105-0, 391 pages.
Garnett EC, Yang P. Silicon nanowire radial p-n junction solar cells, <i>J Am Chem Soc.</i> Jul 23, 2008; 130 (29):9224-5.
Goncher G et al. PN junctions in silicon nanowires, <i>J Electronic Materials</i> 35: 1509-1512, 2006.
Gray, "Chapter 3. The Physics of the Solar Cell," <i>Handbook of Photovoltaic Science and Engineering</i> , 2003, pp. 61-112.
Green, "Chapter 10. Silicon Solar Cells, Advanced Principles & Practice," <i>Centre for Photovoltaic Devices and Systems</i> , Mar. 1995, ISBN 0733409946, 35 pages.
Hagglund C et al. Enhanced charge carrier generation in dye sensitized solar cells by nanoparticle plasmons. <i>Appl. Phys. Lett.</i> 92 (1): 013113-013113-3, 2008.
Heidel, TD et al. Surface plasmon polariton mediated energy transfer in organic photovoltaic devices, <i>Appl. Phys. Lett.</i> 91 (9): 093506-093506-3, 2007.
Kayes BM, Atwater HA. Comparison of the device physics principles of planar and radial p-n junction nanorod solar cells, <i>J Appl Phys</i> 97: 114302, 1-11, 2005 .
Kelzenberg et al., "Single-Nanowire Si Solar Cells", <i>California Institute of Technology</i> , 2008 IEEE, 6 pgs.
Kirkengen M et al. Direct generation of charge carriers in c-Si solar cells due to embedded nanoparticles, <i>J Appl Phys</i> 102 (9): 0937131, 1-5 (2007).
Kuiqing Peng et al. "Aligned Single-Crystalline Si Nanowire Arrays for Photovoltaic Applications", <i>Small</i> 1 (11): 1062-1067, 2005.
Liu et al. "A promising p-type transparent conducting material: Layered oxysulfide tCu <sub>2</sub> S <sub>2</sub> tSr <sub>3</sub> Sc <sub>2</sub> O <sub>5</sub> t", <i>Journal of Applied Physics</i> 102, 116108 (2007).
Olson et al., "Chapter 9. High-Efficiency III-V Multijunction Solar Cells," <i>Handbook of Photovoltaic Science and Engineering</i> , 2003, pp. 359-411.
Peng et al., "Motility of Metal Nanoparticles in Silicon and Induced Anisotropic Silicon Etching", <i>Advanced Functional Materials</i> , vol. 18, 2008, pp. 3026-3035.
Peng K et al., "Fabrication of Single-Crystalline Silicon Nanowires by Scratching a Silicon Surface with Catalytic Metal Particles," <i>Advanced Functional Materials</i> , 2006, 16, pp. 387-394.
Tsakalakos et al., "Silicon Nanowire Solar Cells", <i>Applied Physics Letters</i> , Letter 91—233117, 2007, pp. 1-3.

**PUBLIC VERSION**  
**CONFIDENTIAL APPENDIX B**



**UNITED STATES INTERNATIONAL TRADE COMMISSION  
WASHINGTON, D.C.**

**Before the Honorable David P. Shaw  
Administrative Law Judge**

**In the Matter of**

**CERTAIN SILICON PHOTOVOLTAIC  
CELLS AND MODULES WITH  
NANOSTRUCTURES, AND PRODUCTS  
CONTAINING THE SAME**

**Inv. No. 337-TA-1271**

**CONFIDENTIAL APPENDIX B TO HANWHA RESPONDENTS' RESPONSE TO  
THE COMPLAINT AND NOTICE OF INVESTIGATION**

Based on Hanwha's present understanding of the accused Hanwha products and on Hanwha's current and ongoing investigation into these statistical figures, from January 2020 through June 2021, approximately [REDACTED] units of the accused Hanwha products, with an approximate value of [REDACTED], were sold in and/or imported into the United States.

Based on Hanwha's present understanding of the accused Hanwha products, Hanwha and/or one or more of its subsidiaries has the capacity to produce the accused Hanwha products. The accused Hanwha products are manufactured by at least [REDACTED]

**UNITED STATES INTERNATIONAL TRADE COMMISSION  
WASHINGTON, D.C.**

**Before the Honorable David P. Shaw  
Administrative Law Judge**

**In the Matter of**

**CERTAIN SILICON PHOTOVOLTAIC  
CELLS AND MODULES WITH  
NANOSTRUCTURES, AND PRODUCTS  
CONTAINING THE SAME**

**Inv. No. 337-TA-1271**

**VERIFICATION**

I, Noonshil Chung, am authorized to make this verification on behalf of Respondents Hanwha Q CELLS & Advanced Materials Corp., Hanwha Q Cells GmbH, Hanwha Q Cells Malaysia Sdn. Bhd., Hanwha Q Cells (Qidong) Co., Ltd., Hanwha Solutions Corporation, Hanwha Energy USA Holdings Corp. (d/b/a 174 Power Global Corporation), Hanwha Q Cell EPC USA LLC, Hanwha Q Cells America Inc., Hanwha Q Cells USA Corp., Hanwha Q Cells USA Inc., HQC Rock River Solar Holdings LLC, and HQC Rock River Solar Power Generation Station, LLC (collectively, "Hanwha"). I have read the **HANWHA RESPONDENTS' RESPONSE TO THE COMPLAINT AND NOTICE OF INVESTIGATION**, and am familiar with its contents.

I am informed and believe that the matters stated herein are true, and on that ground only, and not based upon personal knowledge of the matters stated herein, I declare under penalty of perjury that the same are true and correct.

Dated: August 18, 2021

Signature: */s/ Noonshil Chung*

Name: Noonshil Chung

Title: Deputy General Counsel

Company: Hanwha Solutions Corporation

**CERTAIN SILICON PHOTOVOLTAIC CELLS AND MODULES WITH  
NANOSTRUCTURES, AND PRODUCTS CONTAINING THE SAME**

**Inv. No. 337-TA-1271**

**CERTIFICATE OF SERVICE**

I, Jeffrey Matthews, hereby certify that true and correct copies of the foregoing document have been served on this 18th day of August 2021, on the following:

<p>The Honorable Lisa R. Barton Secretary <b>U.S. International Trade Commission</b> 500 E Street, SW Washington, D.C. 20436</p>	<p><input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Via Hand Delivery (2 copies) <input type="checkbox"/> Via Electronic Mail <input checked="" type="checkbox"/> Via EDIS</p>
<p>The Honorable David P. Shaw Administrative Law Judge <b>U. S. International Trade Commission</b> 500 E Street, SW Washington, DC 20436 Shaw337@usitc.gov Pyong.Yoon@usitc.gov</p>	<p><input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Via Hand Delivery (2 copies) <input checked="" type="checkbox"/> Via Electronic Mail <input checked="" type="checkbox"/> Via EDIS</p>
<p>Vu Bui The Office of Unfair Import Investigations (OUII) <b>U.S. International Trade Commission</b> 500 E Street, S.W. Washington, D.C. 20436 vu.bui@usitc.gov</p>	<p><input type="checkbox"/> Via First Class Mail <input type="checkbox"/> Via Hand Delivery (2 copies) <input checked="" type="checkbox"/> Via Electronic Mail <input type="checkbox"/> Via EDIS</p>

Jeffrey M. Telep  
Brian White  
Dara M. Kurlancheek  
Joseph Eng  
Brian Hill  
Mercedes Morno  
Richard Lutz, Consultant  
**KING & SPALDING LLP**  
1700 Pennsylvania Avenue, NW  
Suite 200  
Washington, DC 20006  
ASG\_ITC\_1271@kslaw.com

Michael F. Heafey  
**THE LAW OFFICES OF MICHAEL F. HEAFEY**  
1325 Howard Street, No. 160  
Burlingame, California 94010  
(650) 346-4161

Karen Boyd  
Robert Kent  
Zhuanjia Gu  
Cyndi Claxton  
Vyson Hsu  
**TURNER BOYD LLP**  
702 Marshall Street, Suite 640  
Redwood City, California 94063  
(650) 521-5930  
ASG1271Service@TurnerBoyd.com

*Counsel for Complainant*  
*Advanced Silicon Group Technologies, LLC*

- Via First Class Mail
- Via Hand Delivery (2 copies)
- Via Electronic Mail
- Via EDIS

Michael R. Franzinger  
Joseph A. Micallef  
**SIDLEY AUSTIN LLP**  
1501 K Street, NW  
Washington, DC 20005  
CanadianSolar-ASGTSidleyTeam@sidley.com

Michael J. Bettinger  
**SIDLEY AUSTIN LLP**  
555 California Street, Suite 2000  
San Francisco, CA 94104  
Telephone: (415) 772 1200  
Facsimile: (415) 772

Samuel N. Tiu  
**SIDLEY AUSTIN LLP**  
555 West Fifth Street  
Los Angeles, CA 90013  
Telephone: (213) 896-6000  
Facsimile: (213) 896-6600

Michael D. Hatcher  
Tung T. Nguyen  
**SIDLEY AUSTIN LLP**  
2021 McKinney Avenue, Suite 2000  
Dallas, TX 75201  
Telephone (214) 981-3300  
Facsimile (214) 981-3400

Thomas D. Rein  
**SIDLEY AUSTIN LLP**  
One South Dearborn  
Chicago, Ill 60603  
Telephone (312) 853-7000  
Facsimile (312) 853-7036

*Counsel for Respondents*  
*Canadian Solar, Inc.; Canadian Solar International Limited; Canadian Solar Manufacturing (Changshu) Co. Inc.; Canadian Solar Manufacturing (Luoyang) Inc.; Canadian Solar Manufacturing (Thailand) Co. Ltd.; Canadian Solar Manufacturing Vietnam Co. Ltd.; Canadian Solar Solutions, Inc.; Canadian Solar Construction (USA) LLC; Canadian Solar (USA) Inc.; Recurrent Energy LLC; and Recurrent Energy SH Proco LLC*

- Via First Class Mail
- Via Hand Delivery (2 copies)
- Via Electronic Mail
- Via EDIS

Eric S. Namrow

**Morgan, Lewis & Bockius LLP**

1111 Pennsylvania Ave, N.W.

Washington, D.C. 20004-2541

Telephone: (202) 739-3000

Facsimile: (202) 739-3001

ML-Boviet-ITC@morganlewis.com

Shaobin Zhu

Michael J. Lyons

**Morgan, Lewis & Bockius LLP**

1400 Page Mill Road

Palo Alto, CA 94304

Telephone: (650) 843-4000

Facsimile: (650) 843-4001

*Counsel for Respondents Boviet Solar Technology  
Co., Ltd., Ningbo Boway Alloy Material Co., Ltd.,  
Boviet Renewable Power, LLC, and Boviet Solar  
USA Ltd.*

Via First Class Mail

Via Hand Delivery (2 copies)

Via Electronic Mail

Via EDIS

/s/ Jeffrey Matthews

Jeffrey Matthews