Exhibit I

Exhibit C: Evidence of Infringement of U.S. Patent No. 8,075,792

U.S. Patent 8,075,792	
Claim	**Canadian Solar Black Silicon Process**
1. A method of texturing a silicon surface, comprising:	The preamble is not limiting. Nevertheless, on information and belief, Canadian Solar practices a method of texturing a silicon surface that meets every limitation of claim 1. Canadian Solar practices a method of producing black silicon substrates for use in its "Onyx" line of solar cells. The method comprises a "nano-texturing process." *See* Exhibit A, Canadian Solar Form 20-F dated 4/28/2020, at 42: At the beginning of 2015, we started commercial production of Onyx cells with our in-house developed black silicon technology, Onyx technology. Onyx technology employs a nano-texturing process to make the multi-crystalline cell almost fully black, increasing cell efficiency and module wattage at the same time. We started increasing the production volume of Onyx cells in 2016, which have been incorporated into our Quartech and Quintech module families. Canadian Solar has incorporated this method into "all of [its] P4 and P5 solar cell production capacity" since August 2019. *See* Exhibit A at 85: • *High efficiency cells.* Our R&D efforts enabled us to upgrade all of its solar cell production capacity to PERC (passivated emitter and rear cell) technology by the end of August, 2019. Relative to the older aluminum BSF (Back Surface Field) cell technology, PERC improved the power conversion efficiency by more than one percentage point for all three main cell products, namely P4 (multi PERC), P5 (PERC with casted mono) and Mono PERC. We have completed commercializing our in-house developed black silicon technology on multi wafers. This self-developed wet chemical texturing is a unique, IP-protected and cost-effective technology and significantly increases solar cell efficiency due to advanced light absorption and surface passivation. All of the P4 and P5 production capacity is equipped with our black silicon technology. We also developed Exhibit B, published in 2014, is an academic journal article entitled "18.45%-Efficient Multi-Crystalline Silicon Solar Cells with Novel Nanoscale Pseudo-Pyramid Texture." On information and belief, Exhibit B was authored by at least two Canadian Solar employees, Xiaoya Ye and Shuai Zou, and describes the metal-catalyzed chemical etching (MCCE) process that Canadian Solar would later use for mass production of black silicon solar panels. *See* Exhibit B at 8:

	Thousands of P*mc*-Si solar cells with an average efficiency over 18% have been fabricated in a standard production line, and the figure of merit is ca. \$0.0084 W^{-1} better than that of *mc*-Si one (see Supporting Information S5). Such results are very tantalizing for the whole photovoltaic community. The *See also id.*: lines while remaining cost-effective. We believe the technique of MCCE plus post-alkaline etching has staked out a solid step towards mass production, and it has a great potential to become a standard process for producing highly efficient *mc*-Si solar cells in the future.
positioning a substrate with a silicon surface in a vessel;	Canadian Solar's black silicon manufacturing process comprises dipping a "micrometer-textured *mc*-Si wafer" into a liquid "$AgNO_3$/HF mixture." *See* Exhibit B at 4: nanometers (as shown in the insert of Figure 1b). We use the micrometer-textured *mc*-Si wafer as a substrate for the growth of Ag nanoparticles by simply dipping it in the $AgNO_3$/HF mixture solution for 10 s. In this step, the Ag ions inject holes into the valence band of the Si substrate, and then are reduced and form nuclei on the surface of the Si; in parallel, holes injected into the Si substrate oxidize the Si to Si oxide.[25] Figure 1c shows that Ag nanoparticles of a diameter about 20–50 nm have formed on the wafer dispersedly, and have covered ca. 28% of the total area of the wafer. It has been reported that the dendrite structures of silver can be formed on the Si substrate for a relatively long time (e.g., longer than 30 min);[26] in our case, about 10 s deposition can result in some irregular congestion of silver particles, as a close observation from the insert of Figure 1c. This step inherently requires that the substrate (i.e., the silicon wafer) is positioned within a vessel so that it may be "dipped" in the mixture as described below.

filling the vessel with a volume of an etching solution that covers the silicon surface of the substrate,	Canadian Solar's black silicon manufacturing process comprises dipping a "micrometer-textured *mc*-Si wafer" into a liquid "$AgNO_3$/HF mixture." *See* Exhibit B at 4. This step inherently requires that a vessel is filled with a volume of the "$AgNO_3$/HF mixture," which is an etching solution.
wherein the etching solution comprises a catalytic nanomaterial	The etching solution comprises $AgNO_3$, which dissociates in solution to provide silver nanoparticles (i.e., a catalytic nanomaterial). *See* Exhibit B at 4. Notably, Canadian Solar's black silicon manufacturing process results in the formation of silver nanoparticles on the surface of the silicon wafer. *Id.*
and a [sic] oxidant-etchant solution comprising an etching agent and a silicon oxidizing agent;	Canadian Solar's black silicon manufacturing process comprises etching the silicon wafers with an oxidant-etchant solution comprising an etching agent (HF) and a silicon oxidizing agent (H_2O_2). *See* Exhibit B at 4: During the etching of the Ag-loaded silicon wafers in HF and H_2O_2 mixture solution, there are two main parameters determining the resulted microstructures: one is the shape of the Ag nanoparticles; another is the ratio of etchant and oxidant. Defining a parameter ρ as the molar ratio of [HF]/([HF] + [H_2O_2]), we have $\rho = 96.3\%$ for our refined solution. It has been suggested that the etching rate is almost completely determined by the concentration of H_2O_2 for a high percentage of HF ($100\% > \rho > 70\%$), which results in nearly all holes generated at the Ag/Si interface.[27] The morphology shown in Figure 1d is in consistent with the above conclusions. With the increase of etching time, the local silicon area under Ag nanoparticles is etched faster than the naked silicon area, and the Ag nanoparticles sink at the bottom of nanopores;[28] meanwhile, the nanoholes become larger gradually and thus connect to each other. After 2 min etching in HF/ H_2O_2, the diameter of nanoholes becomes ca. 20–50 nm, almost equal to that of Ag nanoparticles, and their depth is ca. 350 nm.

and etching the silicon surface by agitating the etching solution in the vessel.	Canadian Solar's black silicon manufacturing process comprises agitating the etching solution in the vessel. Specifically, the metal-catalyzed chemical etching (MCCE) process described in Exhibit B cannot be successfully carried out unless the etching solution is agitated.
Claim	**Canadian Solar Black Silicon Process**
10. A method of reducing reflectivity of a silicon surface, comprising:	The preamble is not limiting. Nevertheless, on information and belief, Canadian Solar practices a method of reducing reflectivity of a silicon surface that meets every limitation of claim 10. *See generally* claim 1, *supra*.
providing a silicon surface;	Canadian Solar's black silicon manufacturing process comprises dipping a "micrometer-textured *mc*-Si wafer" into a liquid "$AgNO_3$/HF mixture." *See* Exhibit B at 4: nanometers (as shown in the insert of Figure 1b). We use the micrometer-textured *mc*-Si wafer as a substrate for the growth of Ag nanoparticles by simply dipping it in the $AgNO_3$/HF mixture solution for 10 s. In this step, the Ag ions inject holes into the valence band of the Si substrate, and then are reduced and form nuclei on the surface of the Si; in parallel, holes injected into the Si substrate oxidize the Si to Si oxide.[25] Figure 1c shows that Ag nanoparticles of a diameter about 20–50 nm have formed on the wafer dispersedly, and have covered ca. 28% of the total area of the wafer. It has been reported that the dendrite structures of silver can be formed on the Si substrate for a relatively long time (e.g., longer than 30 min);[26] in our case, about 10 s deposition can result in some irregular congestion of silver particles, as a close observation from the insert of Figure 1c. The silicon wafer includes a silicon surface.
positioning a plurality of nanoparticles of a catalytic material proximate to the silicon surface;	Canadian Solar's black silicon manufacturing process comprises dipping a "micrometer-textured *mc*-Si wafer" into a liquid "$AgNO_3$/HF mixture solution." *See* Exhibit B at 4. The silver nitrate ($AgNO_3$) dissociates in solution to provide silver nanoparticles (i.e., nanoparticles of a catalytic material). Notably, Canadian Solar's black silicon manufacturing process results in the formation of silver (Ag) nanoparticles on the surface of the silicon wafer. *Id.*

soaking the silicon surface and the nanoparticles in a bath of oxidant-etchant solution;	Canadian Solar's black silicon manufacturing process comprises etching the silicon wafers by soaking them in an oxidant-etchant solution comprising an etching agent (HF) and a silicon oxidizing agent (H_2O_2). *See* Exhibit B at 4: During the etching of the Ag-loaded silicon wafers in HF and H_2O_2 mixture solution, there are two main parameters determining the resulted microstructures: one is the shape of the Ag nanoparticles; another is the ratio of etchant and oxidant. Defining a parameter ρ as the molar ratio of [HF]/([HF] + [H_2O_2]), we have $\rho = 96.3\%$ for our refined solution. It has been suggested that the etching rate is almost completely determined by the concentration of H_2O_2 for a high percentage of HF ($100\% > \rho > 70\%$), which results in nearly all holes generated at the Ag/Si interface.[27] The morphology shown in Figure 1d is in consistent with the above conclusions. With the increase of etching time, the local silicon area under Ag nanoparticles is etched faster than the naked silicon area, and the Ag nanoparticles sink at the bottom of nanopores;[28] meanwhile, the nanoholes become larger gradually and thus connect to each other. After 2 min etching in HF/ H_2O_2, the diameter of nanoholes becomes ca. 20–50 nm, almost equal to that of Ag nanoparticles, and their depth is ca. 350 nm.
agitating the oxidant-etchant solution until the silicon surface is etched to have a texture that reduces reflectivity of the etched silicon surface;	On information and belief, Canadian Solar's black silicon manufacturing process comprises agitating the etching solution in the vessel. Specifically, the metal-catalyzed chemical etching (MCCE) process described in Exhibit B cannot be successfully carried out unless the etching solution is agitated. Canadian Solar's black silicon manufacturing process results in the formation of a silicon surface having a very low reflectivity of around 2% to 5%. *See* Exhibit B at 4:

	We have made the B*mc*-Si solar cells from nanohole-textured wafers of very low reflectivity, around 2–5%, after HNO_3 dipping and a standard SC2 cleaning process to remove the Ag particles, but their efficiencies are in a range of 13–16.5%, which is significantly lower than that 17.5% in normal *mc*-Si solar cells. A well-accepted reason for the low η is that the number of recombination centers which is proportional to the high surface area of the nanostructure has increased largely.[19,29] Besides, we believe that the Ag nanoparticles inside the deep nanostructure are difficult to remove completely even after both HNO_3 and SC2 cleaning processes.
and removing the nanoparticles from the etched silicon surface with a stripping solution.	Canadian Solar's black silicon manufacturing process comprises removing the nanoparticles from the etched silicon surface with a stripping solution. For example, Ye et al. describe a nanoparticle removal step wherein a silicon wafer is "dipped in a diluted HNO_3 solution for 3 min in order to remove Ag [nanoparticles]." *See* Exhibit B at 9: screen printing to metalize top/bottom electrodes. To obtain B*mc*-Si and P*mc*-Si solar cells, a novel nanotexture process was incorporated into the standard process of *mc*-Si solar cell after the normal acid etching. First, Ag nanoparticles were deposited on the micrometer-textured surface of *mc*-Si wafer by dipping the wafer in $AgNO_3/HF/H_2O$ mixture solution ($AgNO_3$ in 0.001–0.2 mol L^{-1}, HF in 0.01–0.05 mol L^{-1}) for 10 s. Second, the samples were etched in $HF/H_2O_2/H_2O$ (HF at 1–5 mol L^{-1}, H_2O_2 at 1–2 mol L^{-1}) mixture solution at room temperature for 5 min. Due to the strong catalytic action, the Ag nanoparticles sunk into the substrate rapidly, thus leaving numbers of nanopores on the surface; at this stage, the wafer was eventually dipped in a diluted HNO_3 solution for 3 min in order to remove Ag, and labeled as B*mc*-Si. Third, the B*mc*-Si wafers were etched in NaOH/H_2O solution (NaOH in 0.005–0.2 mol L^{-1}, 80 °C) for 120 s to convert above the nanopores into pseudo-pyramids, labeled as P*mc*-Si. Finally, a standard SC2 clean ($HCl/H_2O_2/H_2O$ = 1:1:6, 80 °C, 15 min) was applied to reduce or completely remove residual silver particles. Additionally, the wafer was subjected to "a standard SC2 clean ($HCl/H_2O_2/H_2O$ = 1:1:6, 80 °C, 15 min) … to reduce or completely remove residual silver particles." *Id.*

Claim	**Canadian Solar Black Silicon Process**
17. A method of texturing a silicon wafer, comprising:	The preamble is not limiting. Nevertheless, on information and belief, Canadian Solar practices a method of texturing a silicon wafer that meets every limitation of claim 17. *See generally* claim 1, *supra*.
placing the silicon wafer in a container;	Canadian Solar's black silicon manufacturing process comprises dipping a "micrometer-textured *mc*-Si wafer" into a liquid "$AgNO_3$/HF mixture." *See* Exhibit B at 4: nanometers (as shown in the insert of Figure 1b). We use the micrometer-textured *mc*-Si wafer as a substrate for the growth of Ag nanoparticles by simply dipping it in the $AgNO_3$/HF mixture solution for 10 s. In this step, the Ag ions inject holes into the valence band of the Si substrate, and then are reduced and form nuclei on the surface of the Si; in parallel, holes injected into the Si substrate oxidize the Si to Si oxide.[25] Figure 1c shows that Ag nanoparticles of a diameter about 20–50 nm have formed on the wafer dispersedly, and have covered ca. 28% of the total area of the wafer. It has been reported that the dendrite structures of silver can be formed on the Si substrate for a relatively long time (e.g., longer than 30 min);[26] in our case, about 10 s deposition can result in some irregular congestion of silver particles, as a close observation from the insert of Figure 1c. This step inherently requires that the substrate (i.e., the silicon wafer) is positioned within a container, which holds the $AgNO_3$/HF mixture into which the silicon wafer is "dipped."
providing a volume of solution including metal nanoparticles in the container;	Canadian Solar's black silicon manufacturing process comprises dipping a "micrometer-textured *mc*-Si wafer" into a liquid "$AgNO_3$/HF mixture solution." *See* Exhibit B at 4. A portion of the silver nitrate ($AgNO_3$) dissociates to form silver nanoparticles. Notably, Canadian Solar's black silicon manufacturing process results in the formation of Ag (silver) nanoparticles on the surface of the silicon wafer. *Id.*
providing a volume of oxidant-etchant solution in the container, wherein the oxidant-etchant solution comprises an etching agent and an oxidizing agent;	Canadian Solar's black silicon manufacturing process comprises etching the silicon wafers with an oxidant-etchant solution comprising an etching agent (HF) and a silicon oxidizing agent (H_2O_2). *See* Exhibit B at 4:

	During the etching of the Ag-loaded silicon wafers in HF and H_2O_2 mixture solution, there are two main parameters determining the resulted microstructures: one is the shape of the Ag nanoparticles; another is the ratio of etchant and oxidant. Defining a parameter ρ as the molar ratio of [HF]/([HF] + [H_2O_2]), we have $\rho = 96.3\%$ for our refined solution. It has been suggested that the etching rate is almost completely determined by the concentration of H_2O_2 for a high percentage of HF ($100\% > \rho > 70\%$), which results in nearly all holes generated at the Ag/Si interface.[27] The morphology shown in Figure 1d is in consistent with the above conclusions. With the increase of etching time, the local silicon area under Ag nanoparticles is etched faster than the naked silicon area, and the Ag nanoparticles sink at the bottom of nanopores;[28] meanwhile, the nanoholes become larger gradually and thus connect to each other. After 2 min etching in HF/ H_2O_2, the diameter of nanoholes becomes ca. 20–50 nm, almost equal to that of Ag nanoparticles, and their depth is ca. 350 nm. The "etching of the Ag-loaded silicon wafers in HF and H_2O_2 mixture solution" inherently requires that a volume of oxidant-etchant solution is provided in the container holding the silicon wafer.
agitating the nanoparticle solution and the oxidant-etchant solution in the container until a surface of the silicon wafer becomes etched to have a reflectance of less than about 15 percent;	On information and belief, Canadian Solar's black silicon manufacturing process comprises agitating the etching solution in the vessel. Specifically, the metal-catalyzed chemical etching (MCCE) process described in Exhibit B cannot be successfully carried out unless the etching solution is agitated. Canadian Solar's black silicon manufacturing process results in the formation of a silicon surface having a very low reflectivity of around 2% to 5%. *See* Exhibit B at 4:

	We have made the B*mc*-Si solar cells from nanohole-textured wafers of very low reflectivity, around 2–5%, after HNO_3 dipping and a standard SC2 cleaning process to remove the Ag particles, but their efficiencies are in a range of 13–16.5%, which is significantly lower than that 17.5% in normal *mc*-Si solar cells. A well-accepted reason for the low η is that the number of recombination centers which is proportional to the high surface area of the nanostructure has increased largely.[19,29] Besides, we believe that the Ag nanoparticles inside the deep nanostructure are difficult to remove completely even after both HNO_3 and SC2 cleaning processes.
and removing the metal nanoparticles from the etched surface of the silicon wafer.	Canadian Solar's black silicon manufacturing process comprises removing the nanoparticles from the etched silicon surface with a stripping solution. For example, Ye et al. describe a nanoparticle removal step wherein a silicon wafer is "dipped in a diluted HNO_3 solution for 3 min in order to remove Ag [nanoparticles]." *See* Exhibit B at 9: screen printing to metalize top/bottom electrodes. To obtain B*mc*-Si and P*mc*-Si solar cells, a novel nanotexture process was incorporated into the standard process of *mc*-Si solar cell after the normal acid etching. First, Ag nanoparticles were deposited on the micrometer-textured surface of *mc*-Si wafer by dipping the wafer in $AgNO_3/HF/H_2O$ mixture solution ($AgNO_3$ in 0.001–0.2 mol L^{-1}, HF in 0.01–0.05 mol L^{-1}) for 10 s. Second, the samples were etched in $HF/H_2O_2/H_2O$ (HF at 1–5 mol L^{-1}, H_2O_2 at 1–2 mol L^{-1}) mixture solution at room temperature for 5 min. Due to the strong catalytic action, the Ag nanoparticles sunk into the substrate rapidly, thus leaving numbers of nanopores on the surface; at this stage, the wafer was eventually dipped in a diluted HNO_3 solution for 3 min in order to remove Ag, and labeled as B*mc*-Si. Third, the B*mc*-Si wafers were etched in NaOH/H_2O solution (NaOH in 0.005–0.2 mol L^{-1}, 80 °C) for 120 s to convert above the nanopores into pseudo-pyramids, labeled as P*mc*-Si. Finally, a standard SC2 clean ($HCl/H_2O_2/H_2O$ = 1:1:6, 80 °C, 15 min) was applied to reduce or completely remove residual silver particles. Additionally, the wafer was subjected to "a standard SC2 clean ($HCl/H_2O_2/H_2O$ = 1:1:6, 80 °C, 15 min) … to reduce or completely remove residual silver particles." *Id.*