



Supplementary material

Simple Self-Assembly Strategy of Nanospheres on 3D Substrate and Its Application for Enhanced Textured Silicon Solar Cell

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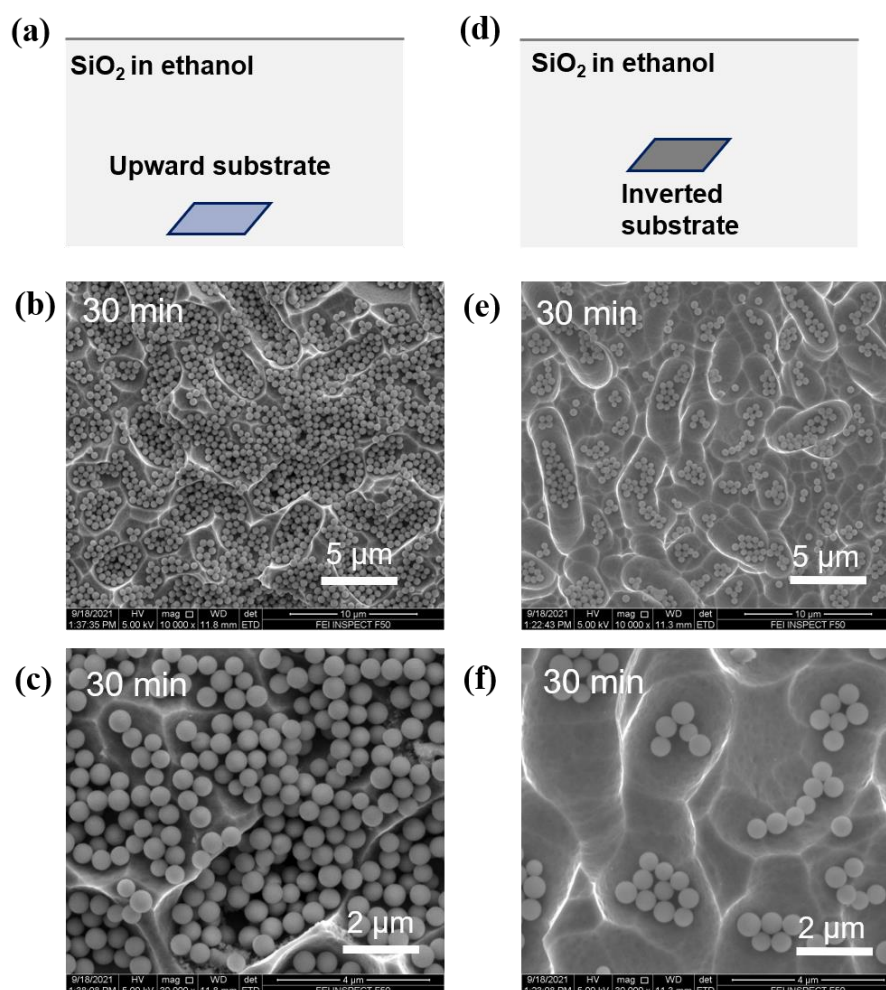


Figure S1. Self-assembly nanocoating under different substrate orientations in the SiO₂ assembly colloid with an assembly time of 30 min. (a)–(c) Schematic illustration and SEM graphs of the assembly with an upward substrate, (d)–(f) Schematic illustration and SEM graphs of the assembly with an inverted substrate.

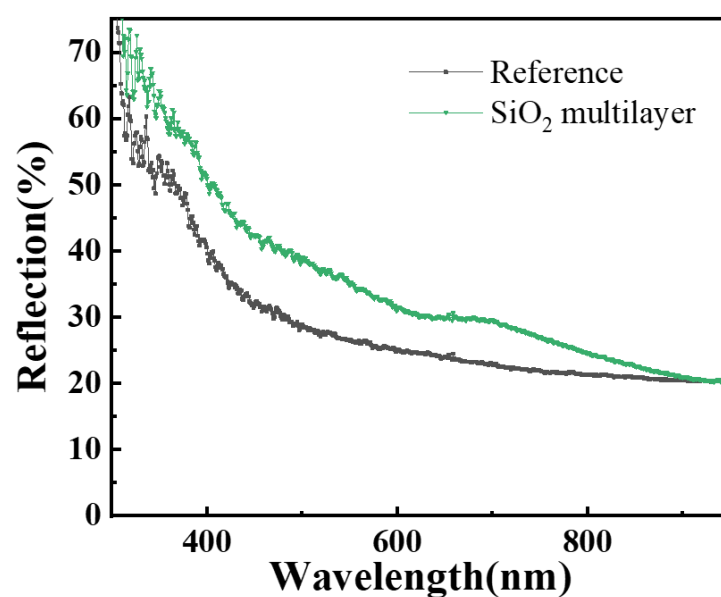
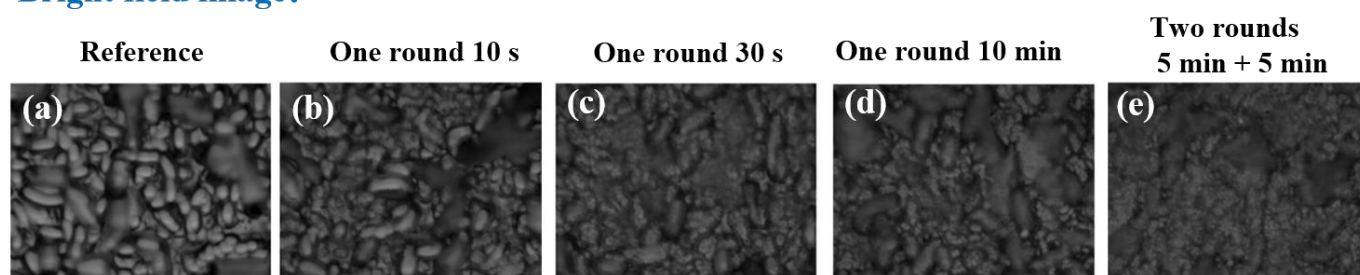


Figure S2. Optical reflection measurement of the textured silicon solar before (black line) and after (green line) five-round SiO₂ repeated assembly process.

Bright field image:



Dark field image:

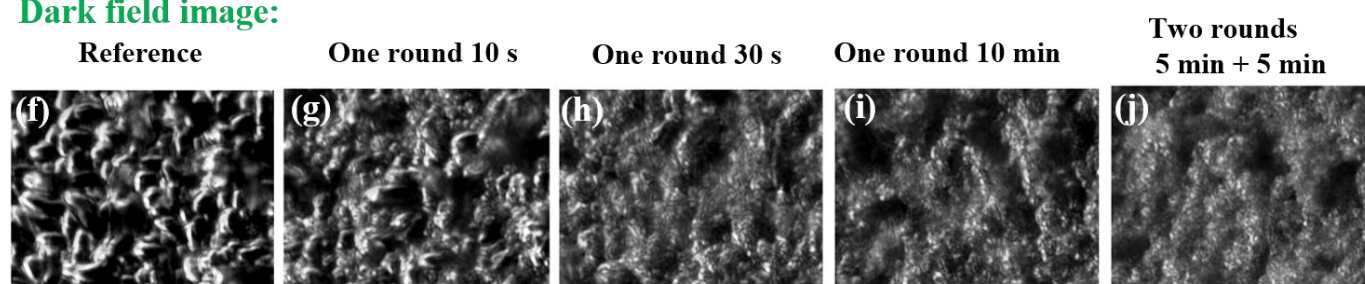


Figure S3. Grayscale image transformation of the micro-region optical images. Bright filed grayscale image for (a) reference solar cell, (b) after one round 10 s assembly, (c) after one round 30 s assembly, (d) after one round 10 min assembly, and (e) after two round 5 min+5 min assembly. Dark filed grayscale image for (f) reference solar cell, (g) after one round 10 s assembly, (h) after one round 30 s assembly, (i) after one round 10 min assembly, and (j) after two round 5 min+5 min assembly.

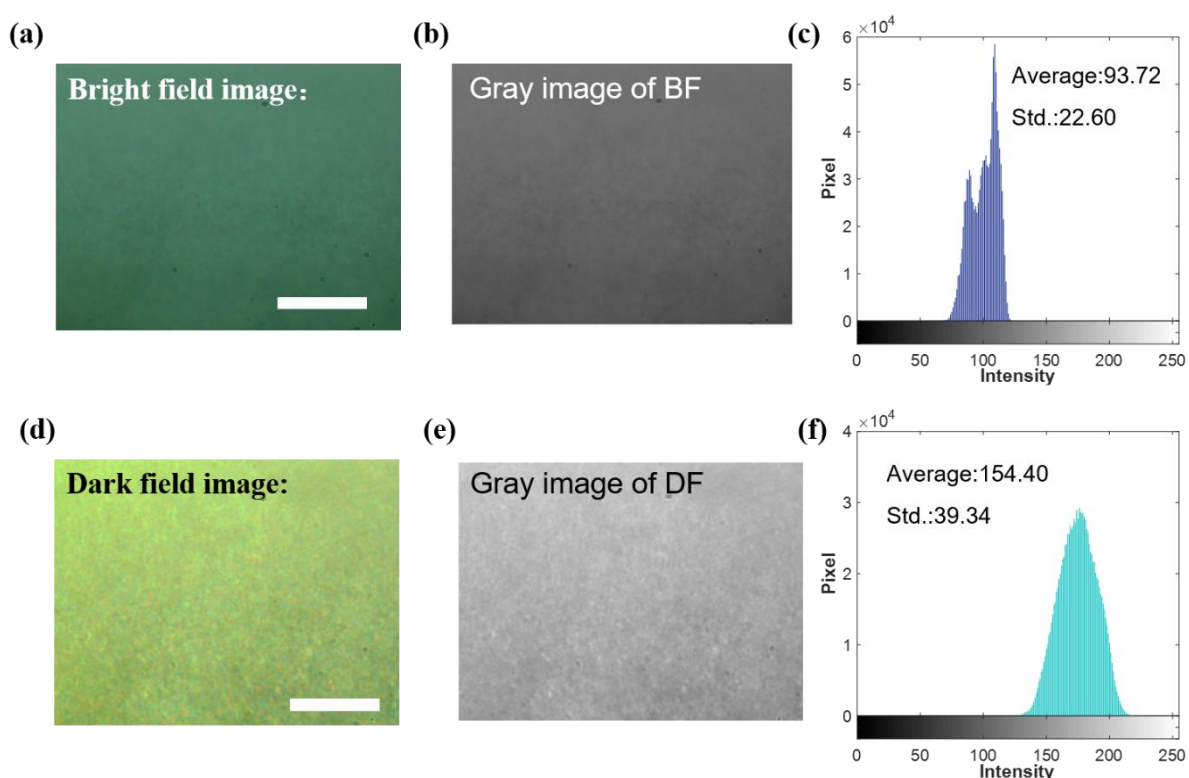


Figure S4. Micro-region optical image analysis of solar cell after five-round SiO_2 repeated assembly process. (a) Original bright field image, (b) Bright field gray image after grayscale transformation, (c) Intensity distribution histogram of bright field gray image, (d) Original dark field image, (e) Dark field gray image after grayscale transformation, (f) Intensity distribution histogram of dark field gray image.