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TÉMA

Nanostructures for crystalline silicon thin-film solar cells

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Recent progresses in liquid phase crystallization enabled the fabrication of thin wafer quality crystalline silicon layers on low-cost glass substrates enabling conversion efficiencies up to 12.1% [1]. Because of its indirect band gap, a thin silicon absorber layer demands for efficient measures for light management. However, the combination of high quality crystalline silicon and light trapping structures is still a critical issue. Here, we implement nanoimprinted, high-temperature stable nanostructures at the sun-facing glass-silicon interface into 10 µm thin liquid phase crystallized silicon thin-film solar cell devices on glass. The resulting structured devices are experimentally studied regarding their optical and optoelectronic properties.

[1] T. Frijnts, S. Kühnapfel, S. Ring, O. Gabriel, S. Calnan, J. Haschke, B. Stannowski, B. Rech, R. Schlatmann, Sol. Energy Mater. Sol. Cells 143 (2015) 457–466.

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