HIGH ASPECT RATIO TRIANGULAR FRONT CONTACTS FOR SOLAR CELLS FABRICATED BY STRING-PRINTING

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MOTIVATION

As much as 10% of light that hits a solar cell is reflected by the contacts¹. By making them triangular, most of that light gets redirected towards the active area of the cell². We propose a scalable method for fabricating high aspect ratio triangular contacts.

PROCESS

The substrate is wetted with a fine string, precisely coated with silver paste. The viscous paste is then stretched to a triangular shape as it’s curing. A high aspect ratio is achieved by controlling the process parameters – temperatures, speeds and string tension.

RESULTS

We optimized string printing to yield contacts with an aspect ratio larger than 1 and a light redirection efficiency or effective transparency of up to 70%, thereby mitigating most of the optical losses inherent to flat metallic front grids.³

²Saive, R., Atwater, H. A. Mesoscale trumps nanoscale: metallic mesoscale contact morphology for improved light trapping, optical absorption and grid conductance in silicon solar cells. Optics Express, 2018; 26(6), A275.