



# Low-cost nanofabrication for light management architectures in ultrathin solar cells

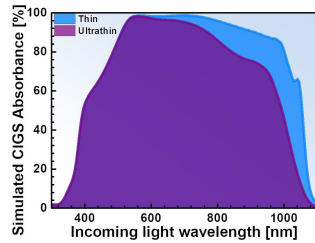
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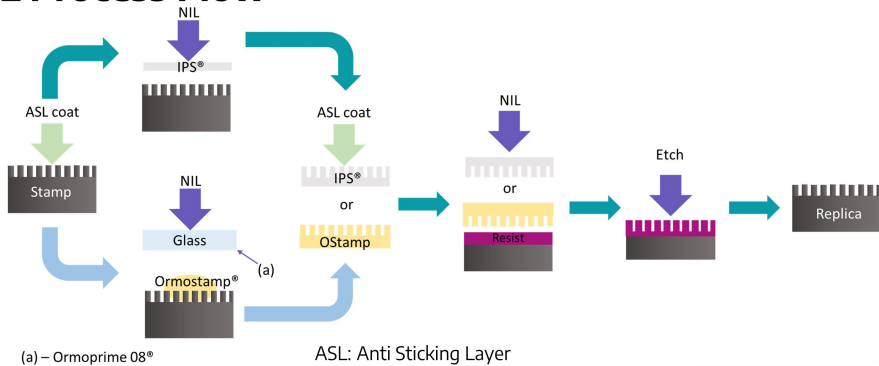
## Motivation

Cu(In,Ga)Se<sub>2</sub> (CIGS) is a thin film technology with a solid record efficiency of 23.35 %. However, it uses scarce materials (In and Ga). Ultrathin absorbers allow for material savings and improve production costs. Nevertheless, a decrease of the absorber thickness leads to incomplete absorption.

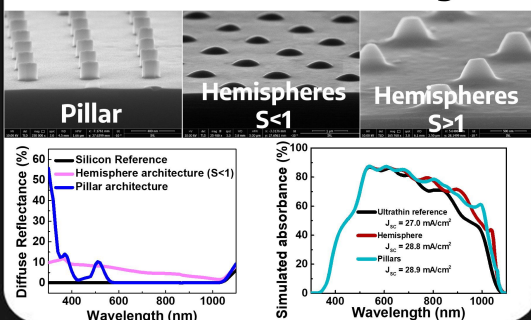
Light management strategies are of utmost importance to allow CIGS technology market expansion. Nanoimprint Lithography (NIL) has emerged as a promising low-cost candidate to fabricate sub-wavelength nanostructures with both ultra high resolution and high throughput.



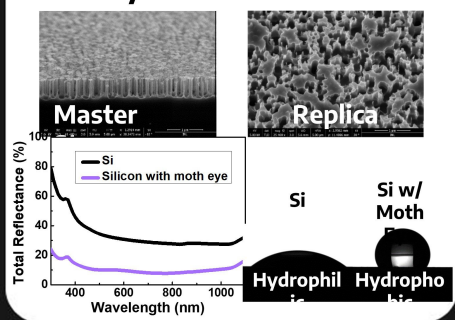
## NIL Process Flow



## Metasurfaces for scattering



## Moth Eye for anti-reflection



## Summary

The light scattering caused by the nanopillars and hemispheres architectures is proven by the increase in diffuse reflectance of the metasurfaces, leading to a predicted optical path length enhancement. The moth eye structure exhibited a broadband decrease in total reflectance. This architecture also presented hydrophobic properties, that can be promising for Building Integrated Photovoltaic (BIPV) applications.

