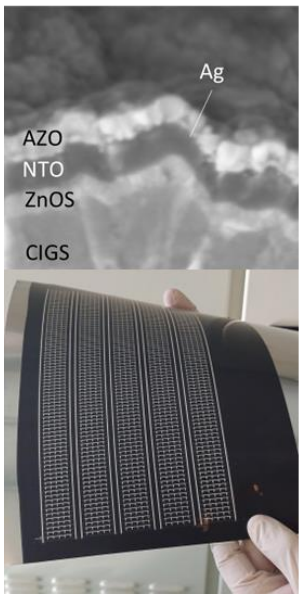
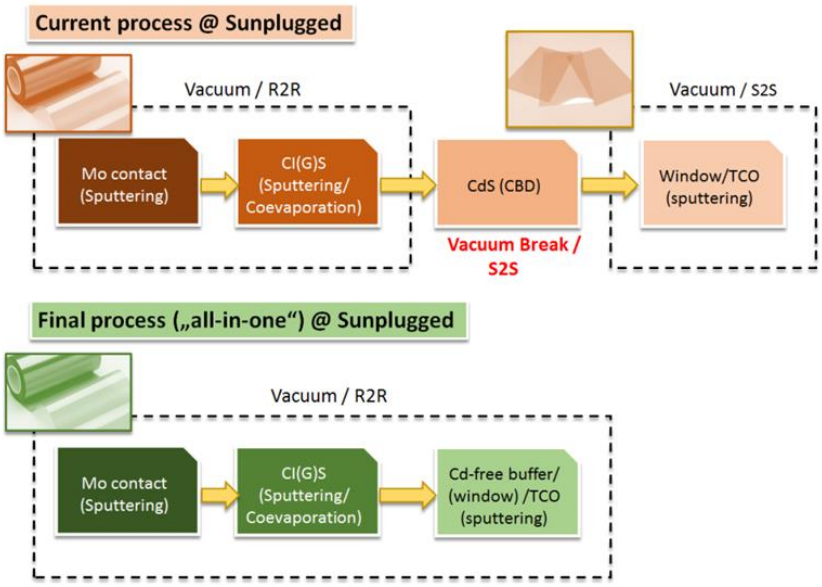
Project Title: Integrated sputtering of inexpensive top-layers for resource efficient solar cells (INSPIRE)





1. What is the purpose of the project?

INSPIRE targeted to increase the power conversion efficiency, lower the production cost and minimize the environmental impact of flexible copper-indium-gallium-selenide (CIGS) photovoltaics (PV). Cornerstone to achieve this target was the replacement of the chemically grown, toxic cadmium sulfide buffer layer in the PV module, with a sputtered, non-toxic alternative and the realization of all fabrication steps under vacuum conditions, in a roll-to-roll process.

2. What challenge does the project address?

The project addresses the challenges of materials and processes sustainability and environmental impact, the lowering of the production costs and the increasing of the production throughput, without compromising the quality and functionality of the product.

3. How does the project tackle the challenge? What is the project's impact, and what will be different after the project?

The project tackled this challenge by investigating an abundant and non-toxic alternative (zinc oxysulphide or ZnOS) to replace the toxic cadmium sulfide (CdS) material, which is a standard component in today's CIGS photovoltaic modules. In parallel, the new material was deposited by sputtering, enabling an all-sputtered, roll-to-roll production process, with reduced environmental impact. The project was finalized in 2020.

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