Crafting Complex Optoelectronic Materials for Energy Conversion

Monica Morales-Masis

Inorganic Materials Science BIOS group,

University of Twente

m.moralesmasis@utwente.nl

Pulsed Laser Deposition (PLD) has offered unique options for the development of complex oxides growth, allowing multi-compound deposition independent of the relative volatility of the elements and ultimate control of interfaces. In this presentation we discuss the rather unexplored but huge potential of PLD for: 1. The controlled growth of halide perovskite thin films for solar cells, with the example of PLD-grown CsSnI3 showing optimum band gap (1.3 eV) and sharp absorption edge ideal for solar cells or NIR LEDs. 2. The implementation of broadband transparent electrodes on top of sensitive solar cell absorbers. This is demonstrated by PLD-grown Zr-doped In2O3 rear electrode in semitransparent halide perovskite solar cells resulting in an improved stabilized efficiency of 15.1%.