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Ultra-thin $Cu(In,Ga)Se_2$ solar cells prepared by an alternative hybrid co-sputtering/evaporation process

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ABSTRACT:

In this work, we have synthetized ultra-thin $Cu(In,Ga)Se_2$ (CIGS) absorbers with an alternative hybrid co-sputtering/evaporation process. Copper, indium and gallium are sputtered simultaneously with the thermal evaporation of selenium, thus avoiding the use of H_2Se. Different CIGS absorbers with a thicknesses lower than 550 nm were deposited by a one-step stabilized process on Mo/soda lime glass substrates. Hence, the growth mechanisms of ultra-thin CIGS films when varying the power values during hybrid process has been studied. The temperature of the selenium effusion cell and the deposition temperature have been fixed to 190 °C and 550 °C respectively. Deposition time has also been fixed to 20 minutes. Ultra-thin CIGS solar cells with conversion efficiencies up to 6.5 % have been fabricated with an absorber layer thickness of 470 nm.