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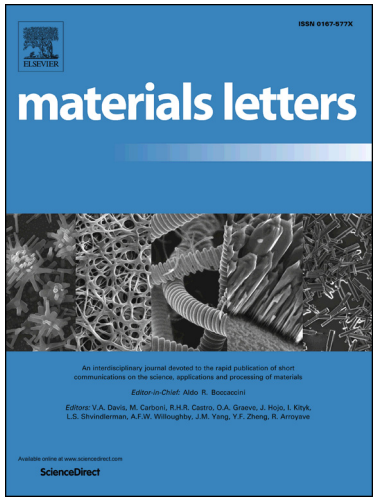

Developing CIGS solar cells on glass-ceramic substrates

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Developing CIGS solar cells on glass-ceramic substrates

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Abstract

$Cu(In,Ga)Se_2$ (CIGS) is a p-type semiconductor material and an attractive absorber for thin films solar cells due to its unique optical and electrical properties. The low cost of this technology is based on its application on ecological substrates (glass, ceramic or glass-ceramic materials), effective uses of raw materials and lower thickness of the film (range from 1.5 to 3 μm). In this work, a new glass-ceramic substrate has been developed using industrial wastes materials (recycled glass, bottom ash and fly ash from a thermal power plant) used as support in thin film solar cell technology. The CIGS absorber has been synthesized by an easy and low-cost way of preparation using the co-precipitation method. The solar cell device has been completed and fully characterized. The obtained films were characterized by X-Ray diffraction (XRD), scanning electron microscope (SEM) and electrical characterization. The short circuit current (Jsc), open circuit voltage (Voc), fill factor (FF), and total area power conversion efficiency (η) of the device are 8,11 mA/cm^2, 168,2 mV, 27,6% and 0,4% respectively.

Keywords: Glass-ceramic, Ceramics, Semiconductor, Solar energy materials, Thin films