

Semi-Transparent Dye-Sensitized Solar Panels for Energy Autonomous Greenhouses

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Abstract : Over 60% highly transparent quasi-solid-state dye-sensitized solar cells (DSSCs) with dimension of 50x50 cm² were fabricated via inkjet printing process using nanocomposite inks as raw materials and tested under outdoor illumination conditions. The cells were electrically characterized, and their possible application to the shell of greenhouses was also examined. The panel design was in Z-interconnection, where the working electrode was inkjet printed on one conductive glass and the counter electrode on a second glass in a sandwich configuration. Silver current collective fingers were printed on the glasses to make the internal electrical connections. In that case, the adjacent cells were connected in series via silver fingers and finally insulated using a UV curing resin to protect them from the corrosive (I³⁺-I²⁺) redox couple of the electrolyte.

Keywords : Dye-sensitized solar panels, inkjet printing, quasi-solid state electrolyte, semi-transparency, scale up

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