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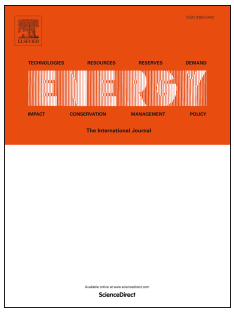

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Assessment of silver nanowires infused with zinc oxide as a transparent electrode for dye-sensitized solar cell applications

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Abstract

This paper presents the results of growing silver nanowire (Ag NW) meshes for utilization as photo-electrodes in dye-sensitized solar cells. These meshes have the advantage of high spectral transmission (> 80%) in the visible-NIR range, and as electrodes, they provide better flexibility compared with traditional glass-based photo-electrodes. Another important feature is the high conductivity (low sheet resistance) compared with their indium-tin oxide (ITO) counterparts. The produced Ag NWs are then filled with a ZnO to act as the electron extraction layer of the solar cell. The evolution of the resulting nanomaterials is monitored by microstructural techniques, such as atomic force microscopy (AFM) and scanning electron microscopy (SEM) while the synthesis of the nanomeshes is done in-solution under controlled conditions. The optical properties of the resulting nanomeshes are determined by spectroscopic measurements within an integrating sphere, while the characteristics of the produced cells are determined by potentiostatic methods and compared to ITO based cells significant increase in performance was achieved.

Keywords: Silver nanowires; transparent photo-electrodes; dye-sensitized solar cells