

O 54. APPLICATION OF HOLMIUM (Ho⁺³) DOPED TiO₂ PHOTOANODES TO IMPROVE PHOTOVOLTAIC PERFORMANCE OF DYE SENSITIZED SOLAR CELLS

Mehmet Gümüş^{1*}, Besime Bilgiç², Teoman Öztürk², Ahmet Emre Kavruk², Mücahit Yılmaz³, Berna Gülveren^{1,2}

¹*Selcuk University, Graduate School of Natural Science, Department of Advanced Materials and Nanotechnology, 42130, Konya, Turkey*

²*Selcuk University, Faculty of Science, Department of Physics, 42130, Konya, Turkey*

³*Necmettin Erbakan University, A.Cengiz Fac. of Eng. Department of Metallurgical and Materials Eng., 42370 Seydişehir/Konya-Turkey*

E-mail: gumusmehmetgumus@gmail.com

ABSTRACT: In this work, pure and Holmium (Ho⁺³) doped TiO₂ pastes were employed to produce dye sensitized solar cells (DSSCs). The influence of using Ho⁺³ doped TiO₂ photoanodes on the photovoltaic performance of DSSCs was investigated. For this purpose, firstly, pure and doped TiO₂ solutions were prepared by sol-gel method and mixed with TiO₂ nanopowder to produce TiO₂ pastes. Then these pastes were applied on FTO substrates by doctor blade technique. The prepared films were used as photoanodes in DSSCs. Some morphological, structural and optical characterization parameters of the photoanodes were determined by SEM (Scanning Electron Microscope), XRD (X-Ray Diffraction) and UV-Vis spectroscopy analyses. The performance of the fabricated cells were determined by Current (I)-Voltage (V) analysis. The impact of doping on the physical properties (characterization) of the photoanodes and thereby the efficiency of the DSSCs was analyzed. It was concluded that the modifications of TiO₂ photoanodes with Holmium (Ho⁺³) doping enhanced the performance of the cells.

Keywords: Dye sensitized solar cell, Holmium, photoanode