

The Effect of Solar Spectral Irradiance and Temperature on the Electrical Characteristics of a ZnO-SiO₂-Si(N) Photovoltaic Structure

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Abstract: The aim of this article is to present an analytic study of the impact of changing solar spectrum and temperature on the performance and electrical characteristics of a MIS solar cell. With this intention, one simulation of the spectral response and the current-voltage characteristic was carried out using a simulation program designed under 'Visual Basic 5' language for this reason. Our study is made on a ZnO-SiO₂-Si (N) solar cell; it proves that the spectral response has higher collection efficiency for carriers generated by ultraviolet light and a conversion efficiency of about 18 % can be obtained under AM1 solar spectrum and at ambient temperature. The results presented indicate also that the increase in solar cell's temperature results a degradation of their performances.

Keywords : MIS solar cell, Solar spectrum, Spectral response, I (V) characteristics, Temperature