

Titania (TiO₂) Band Gap Energy Distribution Which Were Inserted with Cu or Fe Metals, and Its Potential for Solar Cell Application

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ABSTRACT

The purpose of this research is to know the distribution of titania band gap energy inserted with Cu metal, to know the distribution of titania bandgap energy inserted with Fe metal, and to know the potential of titania inserted Cu or Fe if applied as solar cell.

The insertion of Cu or Fe metal in titania is carried out by making titania-copper nanocomposites. Then the nanocomposite is deposited on a transparent electrode with a doctor blade method. The XRD (X-Ray Diffraction) characterization is performed to determine the chemical composition of the coating. The titania-copper layer is also characterized by using a UV-Visible spectrometer to determine its absorbance to light. Through the absorption of titania was analyzed the bandgap energy distribution. The voltage-current characterization (I-V) is performed to determine the performance of the resulting solar cell.

Based on the probability function it is shown the possibility of various bandgap energies in titania, causing the titania band gap energy to shift. The magnitude of the probability does not indicate the concentration with the band gap energy concerned in titania. Based on the XRD characteristic data obtained the content of elements or compounds on TiO₂, TiO₂-Cu and TiO₂-Fe. Based on the characterization of IV, it is shown that there has been a connection between metal and semiconductor material in the sample.

Kata Kunci: titania, band gap energy, Cu or Fe metals, solar cells