

The conductivity study of hybrid solar cells of TiO₂ and doped with Bixa orellana for solar cells application

ABSTRACT

The application of nature dyes was explored for solar cells due to several advantages for green technology. These can be supporting in renewable energy alternatives, which must include solar energy. This system was fabricated as hybrid solar cells, which consist of organic and non-organic materials. Metal oxide semiconductor (MOS), TiO₂, was selected as charge separation and transport. Bixa orellana used as extracted natural dyes solution in order to enhance the absorption of photons. The dyes were extracted by using immersing in methanol solution and left until dyes being extracted. The dyes were coated on ITO glass by using Electrochemical Impedance Spectroscopy (EIS) varied by 1, 3, 5, 7 and 10 layers of scan. This work focuses on conductivity and charge carrier study of thin film. The result shows the conductivity was increase due to several parameters that are, thickness of thin films, and intensity of light, mixture of natural dyes and concentration of dyes solution. The conductivity was then supported with the energy band gap via UV-Vis Spectroscopy.

Keyword: Charge carrier; Conductivity; Hybrid solar cells; Natural dyes; TiO₂