# Bismuth Sulfide and Titanium Oxide as Photo-Electrode Materials for Dye Sensitized Solar Cells

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Energy production for day-to-day use is moving towards renewable energy sources due to them becoming more economically viable, while being less polluting to operate. Solar energy has become one of the major sources of renewable energy. However, it currently relies on ultra-pure silicon ingots to produce commercial silicon photovoltaics, which prevents the cost of electricity being produced to compete with non-renewable energy production.

A viable low-cost alternative for silicon based cells would be dye-sensitized solar cells (DSSC), which are easier and cheaper to manufacture as they do not require expensive and delicate raw materials to make, while they could be made semi-flexible which allows for a greater variety of applications for these cells.

A DSSC consists three components, a photo-electrode, an electrolyte and a counter-electrode. When exposed to incident light, the photoelectrode which contains complex photosensitizers, which releases an electron which is transported to the external load, leaving the photoelectrode in an oxidized state. The electrons are collected by the counter electrode and used to reduce the electrolyte. This charged electrolyte then reduces the positively charged photo-electrode, allowing the process to begin again. To improve the efficiency of this process, we explore the use of Bismuth Sulfide and Titanium Oxide composite as photo-electrode material by testing it in varying ratios and studying their impact on the efficiency of DSSC.