The Utilisation of Organic Chemical Dyes in the Production of Dye-Sensitised Solar Cells

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The use of silicon crystals in regular solar cells is extremely slow to grow and expensive. This makes traditional solar panels expensive to manufacture. A relatively new improvement to solar cell technology is dye-sensitized solar cells. The problem however, is that the type of dyes used in the dye sensitized solar cell can also make it expensive to manufacture. This study investigated the use of organic chemical dyes in dye-sensitized solar cells. Their efficiency and costs of production were also compared to that of regular solar panels. The investigation was divided into 2 phases. Preliminary testing in Phase 1 tested theoretically which dye would be most efficient in a dye sensitized solar cell, using a spectrometer under different light sources. In Phase 2, multiple dye sensitized solar cells were made using different organic dyes to determine which was most effective in generating a current. It was hypothesized that the Pomegranate would be most efficient in absorbing light and would also produce a higher current. The hypothesis was rejected. In Phase 1 the blackberry dye absorbed the most spectrums of the light. This result was verified in Phase 2 where, under direct sunlight the blackberry dye produced the highest millivolt of current. In conclusion, the dye-sensitized solar cell using Blackberry dye was found to be most efficient in generating a current, followed by Pomegranate. The efficiency of the dye is directly attributed to its pigmentation which enabled more photons of light to be absorbed.

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