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Curcumin and Amino-Thymoquinone Dye Sensitized Solar Cells

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Solar energy is turning out to be the most reliable energy source with its abundance and availability. Solar cells are thus assuming significance in the changing scenario. The efficiency of the solar cells is the most challenging factor in fabricating them. Attempts are made to improve the efficiency while capping costs and other environmental effects. Gratzel *et al* showed some promise in solar energy conversion by utilizing dye-sensitized solar cell (DSSC). Natural dye-sensitized solar cells (NDSSC), are also gaining importance for having good light harvesting pigments.. In our present work, we have used curcumin and aminothymoquinone as natural dyes. Both these dyes have good phototoxicity for bacterial film which shows promise against environment degradation. Electron transfer capability of these dyes changes with different solvents. It contains trace elements and most important form of calcium which is ionic calcium. The UV-Vis spectroscopy also yielded expected results which are described in the paper. Also curcumin has good anchoring with TiO_2 semiconductors. The morphology surface roughness, absorption characteristics were studied. The cells' photovoltaic cell performance was tested with standard illumination. For curcumin short-circuit current density (Jsc), open circuit voltage(Voc), Fill factor and Effeciency are 0.187 mA/cm^2, 0.30V,0.36, 0.0259 % and for Aminothymoquinone it is, 2.27 mA/cm^2. 0.54V 0.48, 0.71% respectively. The antioxidant properties of these dyes increase the scope for them (with different solvents) to be used in DSSC