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## DYE SENSITIZED ZNO SOLID-STATE SOLAR CELLS, SENSITIZED WITH D-358 DYE

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With the increasing demand in energy consumption, the need for alternative sources of energy to replace the traditional sources is vital. Thus solar cells have taken the eye of the scientists. Today the Dye Sensitized Solar Cells (DSCs) have drawn the attention of researchers to perform further studies and development. Now this has been optimized to get an efficiency of 12 % for TiO<sub>2</sub> based DSCs. This contains TiO<sub>2</sub> active electrode wrapped by a light absorbing dye, a counter electrode and a liquid electrolyte containing a redox couple between the two electrodes. ZnO is similar to TiO<sub>2</sub> as far as band gap is concerned (~ 3.2 eV), but the maximum efficiency observed for ZnO-based DSC, is around 5 %. On the other hand liquid electrolyte based DSCs limits its practical applications due to the evaporation and leakage of the liquid. In order to deal with these problems, the liquid electrolyte has been replaced by a p-type semiconductor with matching band positions. In this report, the construction and the performance of DSCs based nanoporous ZnO nanoparticles sensitized by D358 dye with a TiO<sub>2</sub> buffer and p-type CuI as the hole collector are discussed.

When constructing the cells, an Atomized Spray Pyrolyzed (ASP) system is used to apply the TiO<sub>2</sub> buffer layer. These are then used for the application of the ZnO porous layer and finally a freshly prepared D358 dye is attached. Performance of the cells are observed using PEC-L01 solar simulator. To optimize the performance, thicknesses of both TiO<sub>2</sub> buffer layer and the ZnO porous layer have been changed. At this point, a maximum efficiency of 2.6 % is obtained for a cell with buffer layer resistance of 370  $\Omega$  cm<sup>-1</sup> and ZnO layer with thickness of 15  $\mu$ m. This efficiency is gained with a short circuit current of 2.48 mA, open circuit voltage of 551 mV and a fill factor of 0.48. This would provide a convenient, high efficient source of energy with low cost materials.