

**E1-03 ITO/n-Cu<sub>2</sub>O/ p-Cu<sub>4</sub>S thin film solar cell**

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Cuprous oxide is an attractive semiconductor material having the potential for use in low-cost solar cells. The method of electrodeposition of Cu<sub>2</sub>O and utilization of electrodeposited Cu<sub>2</sub>O in solar cells are less studied areas which need further investigations. A study was therefore carried out to ascertain the possibility of using electrodeposited Cu<sub>2</sub>O in low-cost solar cells by fabricating an ITO/n-Cu<sub>2</sub>O/p-Cu<sub>4</sub>S thin film heterostructure.

Thin films of Cu<sub>2</sub>O were potentiostatically electrodeposited on ITO coated glass substrates. The Cu<sub>2</sub>O layers were partially sulfided by spraying a Na<sub>2</sub>S solution to form a thin Cu<sub>4</sub>S layer. The optical absorption, spectral response and dark and illuminated I-V measurements of the ITO/n-Cu<sub>2</sub>O/p-Cu<sub>4</sub>S system were obtained to study the properties of the cell. The cell exhibited a V<sub>oc</sub> of 170mV a J<sub>sc</sub> of ~ 0.5mA/cm<sup>2</sup> under AM 1.5 illumination through the ITO substrate.

The spectral response measurements did not indicate an enhancement of the sensitive spectral range of the system beyond the absorption edge of Cu<sub>2</sub>O. The I-V characteristics showed considerable rectification, high series resistance and a low fill factor. It was also revealed that this cell structure possessed an effective potential barrier of ~ 0.5V.

The preliminary results suggest the possibility of utilizing electrodeposited Cu<sub>2</sub>O in combination with p-Cu<sub>4</sub>S in developing a low-cost solar cell.

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