E1-16: Electrochemical study of electrodeposition of cuprous oxide

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Cuprous oxide is a non-toxic and inexpensive semiconductor material having the possibility for use in low-cost solar energy converting devices. The technique of electrodeposition of semiconductor materials is very useful for this purpose. The electrochemical aspects of the electrodeposition of cuprous oxide by employing IV and X-ray measurements were investigated.

A chemical bath containing cupric acetate and sodium acetate aqueous electrolytes was investigated at various temperatures and concentrations. Different substrates, such as platinum, titanium and tin oxide, were employed.

It was observed that a narrow potential domain, about 200 mV, was available for the electrodeposition of cuprous oxide. Good quality films were obtained on all the substrates investigated. The temperature dependence was such that there was a general increase in the cathodic current, however, there was no effect on the potential domain. The increase in the potential towards more cathodic potentials resulted in the co-deposition of cuprous oxide and copper. This was established by electrochemical and X-ray diffraction measurements.

Experimental observations revealed that good quality cuprous oxide thin films can be electrodeposited by potentiostatic electrodeposition.

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