

Electrochemical Study of Copper-Tin Alloy Nucleation Mechanisms onto Different Substrates

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Abstract : In the present work, several materials such as M/glass (M = Pt, Mo) were investigated to test their suitability for studying the early nucleation stages and growth of copper-tin clusters. It was found that most of these materials stand as good substrates to be used in the study of the nucleation and growth of electrodeposited Cu-Sn alloys from aqueous solution containing CuCl₂, SnCl₂ as electroactive species and Na₃C₆H₅O₇ as complexing agent. Among these substrates, Pt shows instantaneous models followed by 3D diffusion-limited growth. On the other hand, the electrodeposited copper-tin thin films onto Mo substrate followed progressive nucleation. The deposition mechanism of the Cu-Sn films has been studied using stationary electrochemical techniques (cyclic voltammetry (CV) and chronoamperometry (CA). The structural, morphological and compositional of characterization have been studied using X-ray diffraction (XRD), scanning electron microscopy (SEM) and EDAX techniques respectively.

Keywords : electrodeposition, CuSn, nucleation, mechanism

Conference Title : ICSREE 2015 : International Conference on Sustainable and Renewable Energy Engineering

Conference Location : Paris, France

Conference Dates : October 29-30, 2015