The influence of deposition potentials on Cu nanoparticles on Mo electrodes

Abstract
Copper electrodeposition and nucleation on a Mo electrode from copper sulphate and trisodium citrate electrolytes with deposition potential were investigated using cyclic voltammetry (CV), chronoamperometry (CA), scanning electron microscopy (SEM) and inductively coupled plasma-atomic emission spectrometry (ICP). The aim is to provide copper thin films with controlled thickness (<0.3 μm), later used as inner precursor for CZTS photovoltaic absorber. CA and SEM results suggest that copper nucleation follows an instantaneous nucleation mechanism with three-dimensional growth at all the deposition potentials. The copper nuclei number density and diffusion coefficient increased with the increasing of deposition potential. When the deposition potential is -0.7V (SCE), the deposition efficiency is 100% and the copper thin film is bright and flat.