Electrochimica Acta

Vol. 128, pp 393-399

Electrodeposited Cu2ZnSnS4thin films

M. Valdesa, M. Modibedib, M. Matheb, T. Hilliec,d, M. Vazqueza,∗

aDivisión Electroquimica y Corrosión, INTEMA, UNMdP-CONICET, J. B. Justo 4302 B7608FDQ Mar del Plata, Argentina

bEnergy Materials, CSIR, Pretoria ZA0001, South Africa

cNational Centre for Nano-structured Materials, CSIR, Pretoria ZA0001, South Africa

dDepartment of Physics, University of Free State, Bloemfontein, South Africa

Abstract

Cu2ZnSnS4(CZTS) thin films have been prepared using Electrochemical Atomic Layer Deposition (EC-ALD)and also by one-step conventional constant potential electrodeposition. Optimal deposition conditionswere investigated using cyclic voltammetry (CV). Then, based on CVs results, CZTS films were grownemploying EC-ALD deposition cycles using the sequence Au/S/Cu/S/Zn/S/Sn/S to form the desired qua-ternary compound. In parallel, conventional one-step electrodeposition was carried out at -0.85 V vs.Ag/AgCl over 1 hour. A thermal treatment in sulfur vapor was also investigated in an attempt to optimizethe stoichiometry.The crystal structure of the films was characterized by XRD and micro Raman spectroscopy, while themorphology, thickness, topography and elemental composition were investigated using FIB-SEM andEDS.