

Abstract Submitted  
for the MAR12 Meeting of  
The American Physical Society

**Study of the crystalline phases in paste coating deposition of CIGS** IVAN DAVOLI, IVAN COLANTONI, Università di Roma Tor Vergata, Dipartimento di Fisica, SURFACE ANALYSES LABORATORY COLLABORATION — One or two microns of CIGS can absorb most of the incident solar radiation because  $\text{CuIn}_{1-x}\text{Ga}_x\text{Se}_2$  have a direct band gap with a high absorption coefficient. The theoretical predictions explain that the optimum photovoltaic performance should be provided by a high gallium concentration, but experimentally is observed that above 30% of Ga the efficiency is reduced. This contradictory behaviour is not completely understood. Using paste coating technique for CIGS deposition, we have recently shown a strong correlation among Ga concentration, structural properties and compound stoichiometry. The desired stoichiometric compound will be obtained varying the concentration of the basic elements in the paste. Our diffraction data show that the maximum of the crystalline phase is reached when CIGS have a Ga concentration higher. Furthermore the SEM EDX quantitative analysis performed on the same samples have shown the presence of different phases. Such a phases separation find a theoretical explanation as ODC (Ordered Defect Compound) in Cu-poor system. X-ray absorption spectroscopy reveals the structure around a specific atomic species and allow us to understand the type of phases in chalcopyrite structure.

Ivan Davoli  
Università di Roma Tor Vergata, Dipartimento di Fisica

Date submitted: 19 Nov 2011

Electronic form version 1.4