

## SYNTHESIS OF THE CuInSe<sub>2</sub> THIN FILMS FOR SOLAR CELLS USING SHS TECHNIQUE AND THERMAL EVAPORATION

L. Saad Hamideche<sup>a,\*</sup>, A. Amara<sup>a</sup>, F. Boutarfa<sup>b</sup>, A. Boussoukssou<sup>c</sup>, A. Benaldjia<sup>a</sup>, A. Drici<sup>a</sup>,  
N. Benslim<sup>d</sup>.

<sup>a</sup> Laboratoire d'Etude et de Recherche des Etats Condensés (LEREC), Département de Physique, Faculté des Sciences, Université Badji Mokhtar, Annaba, Algérie

<sup>b</sup> Complex of Arcelor Metal of Elhadjar, Annaba, Algeria.

<sup>c</sup> LAMP, Université de Nantes, 2 Rue de Hossinière, BP 92208. Nantes CEDEX 3, 44322, FRANCE.

<sup>d</sup> Laboratoire d'Etude de Surfaces et Interfaces de la Matière Solide (LESIMS), Département de Physique, Faculté des Sciences, Université Badji Mokhtar, Annaba, Algérie.

\* Département de Physique, Faculté des Sciences, Université Mentouri, Constantine, Algérie.

**Abstract:** The samples of semi conductors of CuInSe<sub>2</sub> were prepared by self propagating high temperature synthesis (SHS) and direct thermal evaporation onto pr-cleaned glass substrates, using a BALZERS coating unit. The as deposited films were annealed in a vacuum at different temperatures. The structural characterization of the as-deposited CuInSe<sub>2</sub> films of various thicknesses has been carried out by X-ray diffraction method. The diffractogram revealed that the CuInSe<sub>2</sub> films are polycrystalline in nature with chalcopyrite structure. The surface morphology of the as-deposited CuInSe<sub>2</sub> thin films has been studied using scanning electron microscope. The transmittance characteristics of the CuInSe<sub>2</sub> films have been studied using double beam spectrophotometer in the wavelength range 4000–15000Å°. The absorption coefficient has been found to be very high and is of the order of 10<sup>5</sup>–10<sup>6</sup> m<sup>-1</sup>. CuInSe<sub>2</sub> films are found to have a direct allowed transition and the optical band gap is found to be in the range 0.85–1.05 eV.

**Key words:** Conversion photovoltaic, CuInSe<sub>2</sub>, optical properties, Absorption coefficient.

### References:

[1] J.Müller, J.Nowoczin, Schmitt. Thin Solid Films **496** 364-370 (2006).

[2] C.Calderon, G.Gordillo, E.Romero, W.Bolaños, and P. Bartolo-Pérez, Phys. Stet, Sol. (b) **242**, N°. 9, 1910-1914 (2005).