Structural and thermal diffusivity studies of polycrystalline (CuSe)1−xSex metal chalcogenide compound

ABSTRACT

This paper reports the preparation and the characterization of the (CuSe)1ī xSex metal chalcogenide semiconductor compounds with different stoichiometric compositions of Se (x = 0, 0.2, 0.4, 0.5, 0.6, 0.8, 1.0) in bulk form. The (CuSe)1ī xSex compounds were prepared using the solid state reaction by varying the ratio of CuSe:Se in the reaction mixture. X-ray powder diffraction analysis is used to identify and measure the mass absorption coefficient of the (CuSe)1ī xSex compounds to support the thermal diffusivity behaviour. The thermal diffusivity of the polycrystalline (CuSe)1ī xSex compounds were measured and analyzed for the first time, using the photoflash technique. The thermal diffusivity values were determined to be in the range of 2.524 × 10ī 3 cm 2 /s to 1.125 × 10ī 2 cm 2 /s. It was found that the thermal diffusivity value tends to decrease as the parameter x increases. The relationship between the thermal diffusivity, mass absorption coefficient and density of the (CuSe)1ī xSex are discussed in detail.

Keyword: Thermal diffusivity; Metal chalcogenide compound