**Abstract**

Phase pure Cu2ZnSnS4 (CZTS) and its related quaternary chalcogenides are promising material for photovoltaic applications. The incorporation of transition metal cations into any semiconductor systems may led to very interesting physical and chemical properties which make them suitable for applications in optoelectronic devices. In this study, a novel synthesis of Cu2NiSnS4 (CNTS) quaternary nanoparticles by the facile Chemical Route Method. The structural, morphological, optical and electrical characteristics of the synthesized nanoparticles have been analyzed. The results obtained confirm the formation of phase pure CNTS nanoparticles. The average size of the synthesized nanoparticles is estimated to be around 30nm. The obtained optical band gap of the CNTS nanoparticles are in good agreement with the optimum value required for an absorber material in photovoltaic solar energy-conversions. This study shows the viability of synthesizing nanoparticles with elements which are abundantly available by using an environmentally-friendly and low cost process which is potential for energy- conversion applications.