

Abstract Submitted
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Synthesis and thermoelectric properties of nanosize CoSb₃ skutterudite by solvothermal route WENZHI LI, LATHA KUMARI, Department of Physics, Florida International University, ZHIFENG REN, Department of Physics, Boston College, FLORIDA INTERNATIONAL UNIVERSITY TEAM, BOSTON COLLEGE COLLABORATION — Skutterudite CoSb₃ material has remarkable thermoelectric property and great potential applications for thermoelectric power generation and solid state cooling. In this work, we report the synthesis of the skutterudite CoSb₃ nanoparticles by solvothermal method with or without surfactants. Pure cubic phase of CoSb₃ has been synthesized with or without the surfactants; however, the size and shape of the CoSb₃ nanoparticles are affected by the surfactants. The small particles have an optical band gap of around 3.44 eV and a broad photoluminescence emission band with maximum at 409 nm. Thermoelectric measurements were performed on the nanosize CoSb₃ materials. A maximum power factor of $1.3 \times 10^{-4} \text{Wm}^{-1}\text{K}^{-2}$, low thermal conductivity of $1.5 \text{Wm}^{-1}\text{K}^{-1}$ and thermoelectric figure of merit (ZT) of 0.06 was obtained at 720 K. The skutterudite CoSb₃ nanostructures may be used to develop high efficiency thermoelectric devices.

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