

Abstract Submitted
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Enhancement of thermoelectric figure of merit of nanostructured FeSb₂ by adding Cu nanoparticles MACHHINDRA KOIRALA, HUAIZHOU ZHAO, Department of Physics and TcSUH, University of Houston, Houston, TX 77204, USA, MANI POKHAREL, Department of Physics, Boston College, Chestnut Hill, MA 02467, USA, SHUO CHEN, Department of Physics and TcSUH, University of Houston, Houston, TX 77204, USA, CYRIL OPEIL, Department of Physics, Boston College, Chestnut Hill, MA 02467, USA, GANG CHEN, Department of Mechanical Engineering, MIT, Cambridge, MA 02139, USA, ZHIFENG REN, Department of Physics and TcSUH, University of Houston, Houston, TX 77204, USA — We present the enhancement of thermoelectric properties of FeSb₂ through modulation doping by Cu nanoparticles. Since, FeSb₂ and Cu have matched work function, the electrical conductivity of this Kondo-like system can be increased dramatically without affecting Seebeck coefficient. The optimized nanocomposite FeSb₂Cu_{0.045} has enhancement of power factor by 90% compared to pure nanostructured FeSb₂. The further reduction of thermal conductivity from FeSb₂/Cu interface gives the total enhancement of figure of merit (ZT) by 110%. This strategy has been widely used on other semiconductors to improve ZT. Our result demonstrates that the potential of the modulation doping technique can also be extended to Kondo insulator systems.

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