

Solution-based synthesis and processing of Sn-and Bi-doped Cu₃SbSe₄ nanocrystals, nanomaterials and ring-shaped thermoelectric generators

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Descripción: Copper-based chalcogenides that comprise abundant, low-cost, and environmental friendly elements are excellent materials for a number of energy conversion applications, including photovoltaics, photocatalysis, and thermoelectrics (TE). In such applications, the use of solution-processed nanocrystals (NCs) to produce thin films or bulk nanomaterials has associated several potential advantages, such as high material yield and throughput, and composition control with unmatched spatial resolution and cost. Here we report on the production of Cu₃SbSe₄ (CSe) NCs with tuned amounts of Sn and Bi dopants. After proper ligand removal, as monitored by nuclear magnetic resonance and infrared spectroscopy, these NCs were used to produce dense CSe bulk nanomaterials for solid state TE energy conversion. By adjusting the amount of extrinsic dopants, dimensionless TE figures of ...