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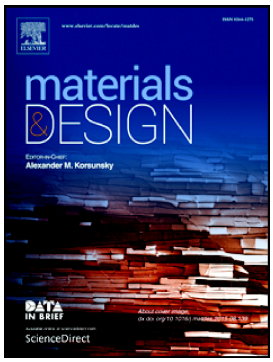

Se-Sm co-doping strategy for tuning the structural and thermoelectric properties of GeTe-PbTe based alloys

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Se-Sm co-doping strategy for tuning the structural and thermoelectric properties of GeTe-PbTe based alloys

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Abstract

Structural design shows great impact on enhancing the thermoelectric performance of the GeTe-PbTe based materials. The Sm and Se elements are introduced to co-dope the GeTe-PbTe based alloys using a conventional solid-solution method followed by spark plasma sintering technique and thermal annealing. The Se doping can increase the solubility of Pb in the GeTe-based matrix, leading to the suppression of the segregated PbTe-based phases. The Sm-Se co-doping introduced secondary phases and twinning microstructures along with the traditional atomic-scale point defects and grain boundaries contribute to the wide-wavelength phonon scattering, leading to the reduction of lattice thermal conductivity.