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Transport and thermoelectric properties of hot-pressed SnSe₂
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SONG COLLABORATION, HYUN-MIN PARK COLLABORATION — Recently,
SnSe has been reported as ultralow thermal conductivity material which make it
become a very high thermoelectric figure of merit ZT material, up to 2.6 at 923 K.
But, it is hard to use SnSe for applications in high temperature range because SnSe
decomposes at 700 K. Therefore, searching for crystalline materials with high ZT
value at lower temperature is still an attracted field of research. SnSe₂ is also 2D
material which is expected to have low lattice thermal conductivity. However, less
is known about thermoelectric property of SnSe₂. Eutectic SnSe₂-Bi₂Se₃ has been
reputed as a promising low-temperature thermoelectric material with $ZT=0.56$ at
593 K. Here, we prepared the polycrystalline SnSe₂ using hot pressure method. At
temperature range up to 573 K, it exhibited an anisotropic n-type charge carrier.
Ultra low thermal conductivity is achieved along parallel direction, however, ZT
value is still very low whose maximum was 0.045 at 573 K due to low electrical
conductivity, and increased with temperature. Our work showed the possibility to
enhance ZT of SnSe₂ polycrystalline via n- and p-type doping experiments.

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