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In-Plane Raman Spectra and Electrical Anisotropies of Layered Tin Selenide XIAOLONG XU, LUN DAI, YU YE, Pku Univ, SCHOOL OF PHYSICS PKU TEAM — Tin selenide has recently attracted particular interest by showing an unexpectedly low thermal conductivity and high power factor, providing great potential for thermoelectric applications. However, tin selenide shows strong anisotropy of their respective power factor. A complete study of the optical and electrical anisotropies of SnSe nanoplates can lead to material/device designs with better performances. In this paper,we synthetize the single-crystal SnSe nanoplates (NPs) on mica substrates by chemical vapor deposition(CVD). We have systemically studied the in-plane anisotropy of Raman modes in SnSe nanoplate by angle dependent and polarized Raman spectroscopy. We also demonstrate that the angular dependence of the Raman response drastically depends on the incoming photon energy and the thickness of SnSe NP. We have also performed the angle-resolved conductance measurement of SnSe NP using 12 electrodes on the same flake spaced at an angle of 30. Therefore, our work offers key insights into the light-matter interaction and electrical property in anisotropic SnSe layered material, thereby paving a coherent route for advancing the study of their anisotropic thermal and thermoelectric properties.

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