

Probing In-plane Anisotropy in Fewlayer ReS₂ Using Low Frequency Noise Measurement

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ReS₂, a layered two-dimensional material popular for its in-plane anisotropic properties is emerging as one of the potential candidates for flexible electronics and ultrafast optical applications. It is an n-type semiconducting material having a layer independent bandgap of 1.55 eV. We have characterized the intrinsic electronic noise level of fewlayer ReS₂ for the first time. Fewlayer ReS₂ FET devices show 1/f nature of noise for frequency ranging over three orders of magnitude. We have also observed that not only the electrical response of the material is anisotropic; the noise level is also direction dependent. In fact the noise is found to be more sensitive towards the anisotropy. This fact has been explained by evoking the theory where the Hooge parameter is not a constant quantity, but has a distinct power law dependence on mobility along the two axes direction. The anisotropy in 1/f noise measurement will pave the way to quantify the anisotropic nature of two-dimensional (2D) materials, which will be helpful for the design of low noise transistor in future.