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Linear polarized photoluminescence properties of few-layer ReS₂ and ReSe₂¹ ZHENGGUANG LU, NIHAR PRADHAN, DANIEL RHODES, SHAHRIAR MEMARAN, National High Magnetic Field Laboratory, Tallahassee FL, 32310, USA, KOMALAVALLI THIRUNAVUKKUARASU, Florida AM University, Tallahassee FL, 32307, USA, ZHIGANG JIANG, School of Physics, Georgia Institute of Technology, Atlanta, Georgia 30332, USA, LUIS BALICAS, DMITRY SMIRNOV, National High Magnetic Field Laboratory, Tallahassee FL, 32310, USA — Here, we present layer-, temperature- and polarization-dependent photoluminescence (PL) measurements on ReS₂ and ReSe₂ thin crystals. The few-layer samples were prepared by mechanical exfoliation of bulk crystals on SiO₂/Si substrates and characterized by AFM and low frequency Raman spectroscopy. At 300K, the PL spectra of both ReS₂ and ReSe₂ show a weak broad peak. A multicomponent PL structure becomes clearly resolved in the low temperature spectra featuring well-separated peaks, and being dominated by two linearly polarized excitonic peaks observed on all samples from bulk to bilayer. Both ReS₂ and ReSe₂ exhibit a very similar near-IR anisotropic PL response, although the polarization angle and the relative intensities of these PL peaks depend on the material and vary with the thickness of the layer.

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