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Raman and transport studies of V2O5 thin flakes[1] GAIHUA YE, Univ of Northern Iowa, SUKRIT SUCHARITAKUL, Case Western Reserve Univ, ZHIPENG YE, Univ of Northern Iowa, XUAN GAO, Case Western Reserve Univ, RUI HE, Univ of Northern Iowa — Vanadium pentoxide, V2O5, is layered material. It is used in many industrial chemical reactions. For bulk V2O5, the lattice parameters are a=11.51 (angstrom), b=3.56 (angstrom), and c=4.37 (angstrom). We probed vibrational and electrical properties of exfoliated flakes of V2O5 with thicknesses between 10-100 nm using Raman spectroscopy and electrical transport. We find that V2O5 is highly anisotropic in the plane. Intensities of Raman modes depend strongly on the relative orientation between the crystal axes and the directions of polarization of incident/scattered light. Through four-probe measurement, conductance anisotropy up to order of 102 between a and b crystal axis is observed. Moreover, samples show thermally activated carriers with activation energy extracted to be 0.11-0.14 eV through electrical conductance measurement at different temperatures. Through Hall measurement, the exfoliated samples show Hall mobility up to 7 cm2/Vs comparable to that of bulk crystals.

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