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INELASTIC NEUTRON SCATTERING FROM THE ISOMORPHOUS LAYERED COMPOUNDS PbI₂, TiSe₂ and TaS₂

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Abstract. — The sample size is the major draw-back in inelastic neutron investigation on layered compounds. We worked on three isomorphous substances PbI₂ [1], TiSe₂ [2], TaS₂ [3]. PbI₂ was available in rather large single crystals (1 cm³) but the dispersion curves did not show much anisotropy. TiSe₂ showed a clearer anisotropy and the upward curvature of the transverse acoustic branch propagating in the layer and polarized perpendicular to the layer. Due to the small sample size (10 mm³) only acoustic branches could be investigated. For 1T-TaS₂ we glued 7 small preoriented lamellae (1 mm³ each) together. Here we found at room temperature the satellites as seen in electron-diffraction. These satellites are incommensurate with the lattice. The sample was a monodomain (trigonal) crystal, but the satellites appear to be twinned. Near the satellites no inelastic maxima could be resolved, while for the symmetry direction |ξ 00 1| a Kohn-anomaly was observed at a |q| comparable to the distance of the satellite from the origin.

References