

Magnetic and Optical Properties of the Quasi-One-Dimensional Magnet NiTe_2O_5

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Various compounds have been reported in the NiO-TeO_2 pseudo-binary system; the most extensively studied is Ni_3TeO_6 , which possesses a polar crystal structure, exhibits collinear antiferromagnetism, and shows a non-hysteretic magnetoelectric response [1]. Among these compounds, NiTe_2O_5 has been relatively recently reported as a quasi-one-dimensional $S = 1$ chain compound [2, 3]. Owing to finite interchain interactions, this system undergoes a long-range magnetic ordering at $T_N = 30.5$ K with unconventional critical exponents, exhibiting a magnetic structure that is nearly collinear along the c -axis and antiferromagnetically aligned between the chains.

Compared with other materials in this family, reports on NiTe_2O_5 are limited. Notably, its reported magnetic space group, $Pbnm$, symmetry-allows electric field-induced nonreciprocal directional dichroism that is a phenomenon we have previously investigated [4]. To elucidate the detailed magnetic and optical properties of this material, we conducted experimental studies including single-crystal synthesis and physical property measurements. In this presentation, we will report on the details of crystal growth, a newly discovered metamagnetic transition around 8 T, spectroscopic measurements across both magnetic ordered phases, and experimental results regarding the nonreciprocal optical response.

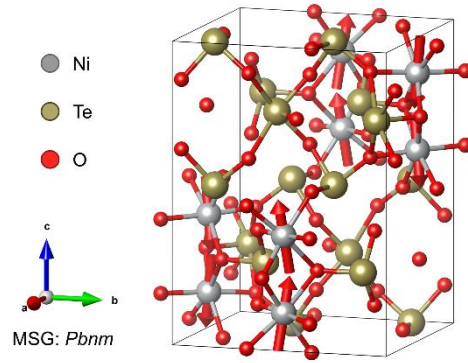


Fig. 1 The magnetic structure of NiTe_2O_5 .

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