

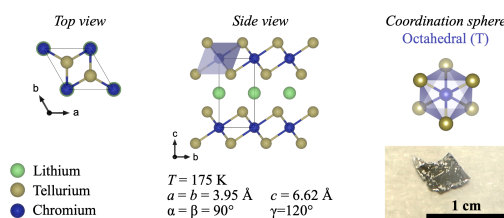
Synthesis and Anisotropic Magnetic Properties of LiCrTe_2 Single Crystals with a Triangular-Lattice Antiferromagnetic Structure

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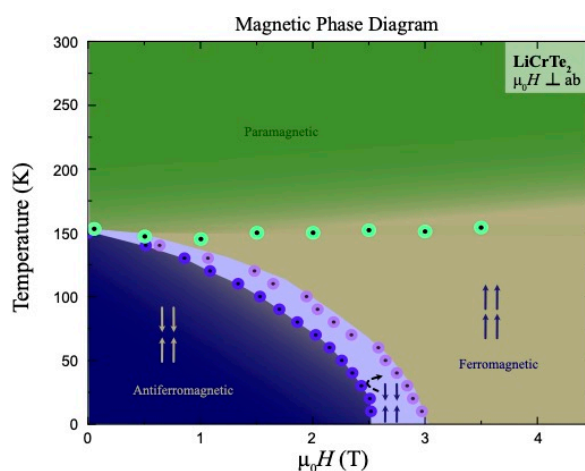
LiCrTe_2 is an antiferromagnetic compound and was synthesized as powder for the first time in 2016 by Kobayashi *et al* because of the expected exotic ground states and physical properties that come along with two-dimensional triangular-lattice compounds.^[1,2] LiCrTe_2 can be understood as a Li intercalated version of the thermodynamically metastable 1T-CrTe₂ van der Waals compound and was believed to have a helical spin structure.^[3]

We report on the single crystal synthesis of LiCrTe_2 employing a Te/Li-flux and find the transition temperature to be substantially higher (~ 150 K) then previously reported (70 K).^[4]



With neutron powder diffraction measurements, we were able to determine the Li content as stoichiometric and elucidate the long-range low temperature magnetic structure as being A-type antiferromagnetic, with the easy axis along the c -direction. This is consistent with our DFT calculations. We have determined the magnetic phase diagram of this material using detailed orientation dependent magnetization measurements and reveal a pronounced metamagnetic transition for $H \perp ab$ with a critical field of $\mu H_{\text{MM}}(5 \text{ K}) \approx 2.5$ T.

Our findings suggest that LiCrTe_2 is a promising material for exploring the interplay between crystal structure and magnetism, and could have potential applications in spin-based 2D devices.



1. Kobayashi S, Ueda H, Michioka C and Yoshimura K, *Inorg. Chem.*, **2016**, [55 7407-13](#).
2. Nocerino E, Kobayashi S, [Witteveen C](#) et al, *arXiv*, **2022**, arXiv:[2211.06864](#)
3. Nocerino E, [Witteveen C](#), Kobayashi S et al, *Sci. Rep.*, **2022**, [12 21657](#)
4. [Witteveen C](#), Nocerino E, López-Paz S et al, *arXiv*, **2023**, arXiv:[2304.01767](#)