

## Poster-1-5

**Molten-Metal Flux Synthesis as a Tool Towards New Quantum Materials**

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Molten-metal flux synthesis is a well-established synthetic approach, in which single-crystal growth is facilitated by dissolving high-melting metals in low-melting ones.[1,2] It has been proven as a fruitful method for the formation of metastable or kinetically stabilized phases, which would otherwise be unattainable by conventional solid-state methods.[3] Layered chromium-chalcogenide-based quantum materials are of particular interest due to their rich magnetism and strong electronic correlations.[4] In this presentation, we systematically explore the engineering of alkali-chromium-telluride flux reactions to obtain large single-crystals of delafossite-type  $ACrTe_2$  ( $A =$  alkali cation) phases as well as previously unreported  $A_{2,4}Cr_8Te_{14}$  compounds, which combine the structural architecture of layered  $ACrTe_2$  phases [4] and tunneled  $ACr_5Te_8$  hollandite-likes [5]. Beyond the synthetic work, we determine their magnetic properties and their spin structure. Their diverse magnetism in combination with their layered structure makes them ideal candidates for future spintronic devices.

[1] Canfield, P. C., Fisher, I. R. High-temperature solution growth of intermetallic single crystals and quasicrystals. *Journal of Crystal Growth* 225, 155-161 (2001).

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[3] Lattner, S. E. Clusters, Assemble: Growth of Intermetallic Compounds from Metal Flux Reactions. *Accounts of Chemical Research* 51, 40-48 (2018).

[4] Kobayashi, S., Ueda, H., Michioka, C., Yoshimura, K. Competition between the Direct Exchange Interaction and Superexchange Interaction in Layered Compounds  $LiCrSe_2$ ,  $LiCrTe_2$ , and  $NaCrTe_2$  with a Triangular Lattice. *Inorganic Chemistry* 55, 7407-7413 (2016).

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