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Impact of Stoichiometry of $\mathbf{Yb_{2+x}Ti_{2-x}O_{7-x/2}}$ on its Structure and Physical Properties[1] KATHRYN ARPINO, BENJAMIN TRUMP, TYREL MCQUEEN, COLLIN BROHOLM, SEYED KOOHPAYEH, Johns Hopkins Univ — The rare-earth pyrochlores ($R_2M_2O_7$) are topic of intense study in the field of magnetism as an ideal host for geometric frustration including spin-liquid and spin-ice behaviour. Specifically, $R_2Ti_2O_7$ has proved a rich playground: compounds R = Ho and Dy are classical spin ices, R = Tb has been shown to be a spin liquid at low temperatures, and R = Yb is a candidate quantum spin ice. This system is attractive for the large anisotropic magnetic properties of rare earth ions, Ti^{4+}'s lack of magnetic moment which isolates the magnetic ordering of R^{3+}, and the comparative ease of making single crystals via the floating zone technique. This talk will present the structure and physical properties of a $Yb_{2+x}Ti_{2-x}O_{7-x/2}$ series including both the pure and stuffed samples. The series shows a dramatic change in the low-temperature (50-200 mK) specific heat signature upon doping away from the pure compound. Understanding the magnetic and physical properties of the off-stoichiometric series sheds light both on the magnetic ordering of the ideal spin ice candidate compound as well as aids in evaluating the quality and stoichiometry of a measured sample. In this vein, proper single-crystal growth conditions in order to ensure single crystals of appropriate stoichiometry will also be discussed.

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