Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

$Sm_2Ti_2O_7$: An exchange spin ice candidate?[1] PAUL SARTE, HARLYN SILVERSTEIN, ARZOO SHARMA, University of Manitoba, ALANNAH HALLAS, McMaster University, HAIDONG ZHOU, University of Tennessee - Knoxville, BRUCE GAULIN, McMaster University, CHRISTOPHER WIEBE, University of Manitoba, University of Winnipeg, McMaster University — A phase pure single crystal of $Sm_2Ti_2O_7$ was grown from phase pure powder synthesized by a standard solid state reaction. A Curie-Weiss fit yielded a Curie constant corresponding to a smaller μ_{eff} compared to $\mu_{eff,free}$ and a value for θ_{CW} corresponding to dominant AFM interactions. C_p measurements were performed at 0 T and 9 T down to 0.35 K with both yielding a low T anomaly but with the latter being shifted to lower T with an increase in Δ from a high T expansion of the Schottky anomaly. While the Schottky fit was successful for 0 T, the fit proved unsuccessful for 9 T indicating possible ordering. With the reduced μ_{eff} and the lack of an LRO state down to 0.35 K, providing an $f >> 1$, the system is frustrated with its $\mathcal{H}$ being J dominated. Future work will consist of growing an isotopically pure crystal for neutron scattering, lower T DC χ measurements to reduce CF effects, AC χ to yield τ through degenerate configurations with the objective for providing a comparison with spin ices in literature. Furthermore, additional C_p at multiple H_o and at lower T will be performed to determine both $\Delta(H_o)$ and if the 9 T anomaly is indeed a transition that is electronic in origin.

[1]NSERC, CFI, NSF and ACS PRF

Paul Sarte
University of Manitoba

Date submitted: 15 Nov 2013 Electronic form version 1.4