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Phase Diagram of the Li_2O-V_2O_3-V_2O_5 System at 700 °C: Correlations with Magnetic Defect Concentration in Heavy Fermion LiV_2O_4[1] S. DAS, X. ZONG, X. MA, A. NIAZI, D.C. JOHNSTON, Ames Lab. and Dept. Phys. Astron., Iowa State U., Ames, IA 50011 — Polycrystalline samples of LiV_2O_4 have been synthesized with magnetic defect concentrations n ranging from 0.01 mol% to 0.77 mol% and average spins S from 3/2 to 4. (1) Low-temperature T magnetic susceptibility χ and magnetization M versus applied magnetic field H isotherms were measured to determine these n and S values. Here we report the phase diagram of the Li_2O-V_2O_3-V_2O_5 ternary system at 700 °C for compositions in equilibrium with LiV_2O_4. This study provided a clarification of the synthesis conditions under which low and high magnetic defect concentrations can be obtained in LiV_2O_4. The samples were prepared using conventional solid state reaction of appropriate amounts of Li_2CO_3, V_2O_3 and V_2O_5. $M(H)$ isotherms and $\chi(T)$ data were obtained on many of these samples. We confirmed that the LiV_2O_4 phase can be obtained containing low (0.01 mol%) to high ($\geq$ 0.5 mol%) magnetic defect concentrations and with consistently high defect S values around 3 to 4. The highest n values were obtained for LiV_2O_4 samples in equilibrium with V_2O_3 and the lowest values for LiV_2O_4 samples in equilibrium with V_3O_5, consistent with the results in Ref. (1).
(1) S. Kondo et al., PRL **78**, 3721 (1997); PRB **59**, 2609 (1999).

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