Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Hole-doping of $Ca_{1-x}Na_xV_2O_4$ ($x = 0 - 0.5$) With Zig-Zag Vanadium Chains[1] A. NIAZI, D.C. JOHNSTON, Ames Lab., Iowa State Univ., Ames, IA 50011, USA — CaV_2O_4 crystallizes in an orthorhombic *Pnam* structure with $S = 1$ zig-zag V chains along the *c*-axis. In this low-dimensional, insulating system the triangular arrangement of V atoms with $J_1 \approx J_2$ leads to competing frustrating antiferromagnetic (AF) interactions. Our recent studies on powders and single crystals of CaV_2O_4 show long-range AF ordering at a Néel temperature $T_N \sim 75 - 78$ K (with a monoclinic distortion at $\sim 145-150$ K) and signatures of partial spin-freezing below 20 K. We have tried doping CaV_2O_4 into the metallic state by substitution at the Ca site to drive V into fractional valence states. We have succeeded in replacing Ca upto 50% by Na at 1200 °C. Powder XRD patterns of our Na-substituted samples are nearly single-phase CaV_2O_4-type, while the *c*-axis lattice parameter decreases sharply - Thus Na indeed substitutes for Ca instead of occupying interstitial positions. The room temperature resistance of Na-doped sintered pellets decreases significantly. High field ($H = 1$ T) dc magnetization measurements show a steep fall in T_N while low field ($H = 100$ Oe) data suggest onset of spin-glass like behavior as the Na content increases. We shall present our results and discuss the evolution from a partially disordered AF insulator to a spin-glass.

[1]Supported by the USDOE under Contract No. W-7405-ENG-82.

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Date submitted: 15 Dec 2006 Electronic form version 1.4