Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Electron Paramagnetic Resonance Study of Amorphous V_2O_5
D.B. BAKER, K. HARTMAN, K.C. MAYNES, P.H. BUNTON, William Jewell College, S. FELLER, Coe College — Vitreous V_2O_5 is generally non-stoichiometric when cooled from above the melt, leading to the formation of paramagnetic V^{4+} ions. At low temperature (∼120 K), previous workers have observed well-resolved EPR spectra associated with these centers. By contrast, recent results from our laboratory show EPR spectra that remain broad (∼20 mT, peak-to-peak) from ambient down to 120 K, with no apparent hyperfine interactions. EPR spin counting analyses also indicate high concentrations ($\sim 10^{20}$ spins/cm^3) of paramagnetic centers, suggesting that linewidths are limited by spin-spin relaxation of the electron spin system. In addition, current results reveal that EPR signal intensities increase more rapidly than (Temperature)$^{-1}$, as indicated by monitoring signal intensities over the temperature range from 120-300 K. In particular, when temperature is decreased by a factor of two (from 240 to 120 K), signal intensity increases by a factor of approximately 10. Such observations indicate the possibility of superparamagnetic or spin glass behavior within the amorphous V_2O_5 system. In order to further investigate the magnetic behavior of amorphous V_2O_5, several experimental EPR parameters are evaluated over the temperature range from 120-370 K.

D.B. Baker
William Jewell College

Date submitted: 28 Nov 2005 Electronic form version 1.4