Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Comparison of Magnetic Field-Modified Electronic Excitations in Ni(II) Compounds VIRGINIA LONG, E.C. SCHUNDLER, P.O. MAKUMBE, Colby College, Waterville ME, X. WEI, NHMFL, Tallahassee, FL, B.R. LANDRY, K.R. MAXCY, M.M. TURNBULL, C.P. LANDEE, Clark University, Worcester MA — NTDN ($Ni[tn]_2[NO_2]_2$) can be considered a paramagnetic analog material to the Haldane compounds NENP and NENB ($Ni[en]_2NO_2ClO_4$ and $Ni[en]_2NO_2BF_4$; where en = $C_2N_2H_8$ and tn = $C_2N_3H_10$). Except for the different bonding of one NO_2 group and the absence or presence of spin chains, NTDN and the Haldane compounds have nearly identical electronic coordination around the Ni^{2+} ions. Here, we report and compare the magnetic field (H)-dependent polarized optical transmittance of the three materials in the range 9,000 to 22,000 cm^{-1}. The H dependence is manifest in the varying intensities of certain electronic absorptions with applied field. Although all three materials possess similar H- sensitive excitations, the details of the H dependence differ with the magnetic ground states. In NTDN, the intensity changes commence at $H = 0$ and saturate at ≈ 10 T, whereas in the Haldane compounds, the onset of changes is at the gap- closing critical field, H_C, above which the intensity is linearly modified with field. The mechanism of the H- dependence is yet to be clarified and probably depends on the nature of the electronic excitation. Intensity variations with applied field are observed in both Ni^{2+}-to-NO_2^- charge transfer transitions and Ni^{2+} $d-d$ spin forbidden excitations.

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Date submitted: 29 Nov 2005 Electronic form version 1.4