

Abstract Submitted  
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**Electronic Excitations in NiCl<sub>2</sub> Hydrates** V.C. LONG, N.M. COLLINS, G.R. RAYNER, Colby College, Waterville ME, G.C. DEFOTIS, A.S. HAMPTON, J.M. POTHEN, College of William and Mary, Williamsburg VA — We measured the temperature-dependent optical absorption spectra of pure polycrystalline NiCl<sub>2</sub>·2H<sub>2</sub>O between 4,000 and 35,000 cm<sup>-1</sup> and of powdered NiCl<sub>2</sub>·2H<sub>2</sub>O and NiCl<sub>2</sub>·H<sub>2</sub>O (pressed into KBr pellets) in more limited frequency regions. NiCl<sub>2</sub>·2H<sub>2</sub>O has a known complex phase diagram with distinct antiferromagnetic (AF) phases in successively lower temperature regions. It has a rich low temperature spectrum consisting of parity forbidden spin allowed and spin forbidden *d* – *d* excitations of the pseudo-octahedrally coordinated Ni<sup>2+</sup> ion with fine structure due to vibronic sidebands, magnetic dipole allowed transitions, and possible electron-magnon coupling. Although most NiCl<sub>2</sub>·2H<sub>2</sub>O bands show a typical gradually increasing definition with decreasing temperature, a narrow absorption at 12,600 cm<sup>-1</sup> is strongly suppressed below the lowest AF transition at 6.3 K. The magnetic properties of NiCl<sub>2</sub>·H<sub>2</sub>O are more poorly understood, involving unconventional low dimensional behavior. Although the pressed pellet spectra reveal a loss of detailed spectral information, a downshift of ~ 300 cm<sup>-1</sup> in the second spin allowed band and associated spin forbidden transition can be discerned for the monohydrate compared to the dihydrate.

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