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Correlation of electric polarization and magnetic ordering in cobalt chloride thiourea EUNDEOK MUN, National High Magnetic Field Laboratory (NHMFL), Los Alamos National Lab (LANL), Los Alamos, NM, JASON WILCOX, JAMIE MANSON, Department of Chemistry and Biochemistry Eastern Washington University Cheney, WA 99004 USA, BRIAN SCOTT, MPA-MC, Los Alamos National Lab (LANL), Los Alamos, NM, PAUL TOBASH, ERIC BAUER, VIVIEN ZAPF, MPA-CMMS, Los Alamos National Lab (LANL), Los Alamos, NM
— The coupling between electricity and magnetism in magneto-electric multiferroics has been intensively investigated in a wide range of transition metal oxides. Recently the material classes have been extended to organo-metallic insulators (sometimes known as metal-organic frameworks or molecular magnets) such as $NiCl_2$-4[$SC(NH_2)_2$], which provides a new arena for designing magneto-electric multiferroics. We have grown single crystals of cobalt chloride thiourea, $CoCl_2$-n[$SC(NH_2)_2$], which forms two different crystal structures with n = 2 and 4. The compound $CoCl_2$-2[$SC(NH_2)_2$] has a triclinic crystal structure with strong magnetic anisotropy and $\sim$ 3 μ_B/Co ion, indicating $\mathbf{S} = 3/2$ Co spins, and the compound $CoCl_2$-4[$SC(NH_2)_2$] has a tetragonal structure with almost no magnetic anisotropy and 1 μ_B/Co ion, indicating $\mathbf{S} = 1/2$ Co spins. We will present details of the magnetic field-induced electric polarizations and magnetic properties of these compounds.

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