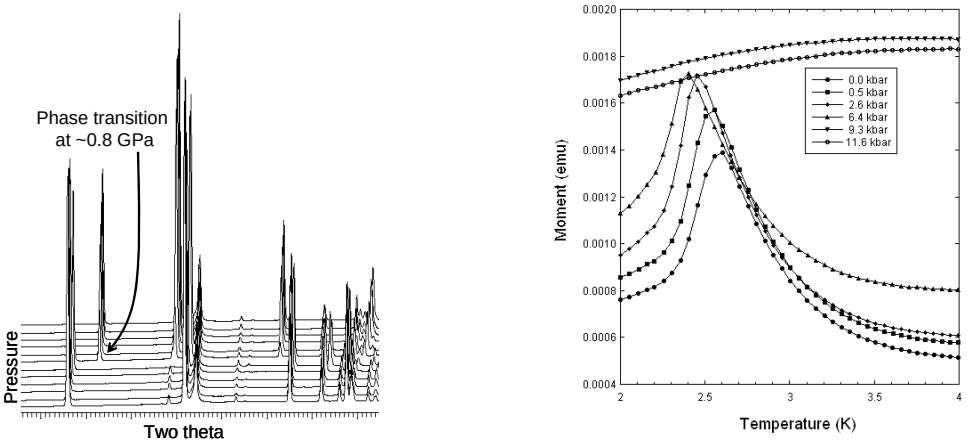
Control of Magnetic Dimensionality Through Application of Pressure in Hydrogen Bonded Magnetic Coordination Polymers

John A. Schlueter[1], Gregory J. Halder[1], Karena W. Chapman[2], and Jamie L. Manson[3]
[1] *Materials Science Division, Argonne National Laboratory, Argonne, IL, 60439, USA*
[2] *X-ray Science Division, Advanced Photon Source, Argonne National Lab., Argonne, IL 60439, USA*
[3] *Department of Chemistry, Eastern Washington University, Cheney, WA, 99004, USA.*
Email: JASchlueter@anl.gov

We have studied the use of very strong hydrogen bonds as structure-directing entities in magnetic coordination polymers such as $[Cu(pyz)_2(HF_2)]X$ (pyz = pyrazine; *X* = tetrahedral or octahedral anion) [1] and $CuF_2(H_2O)_2(pyz)$ [2]. In fluorinated systems, competition for hydrogen bonding interactions enables the stabilization of polymorphs with small energy differences [3]. This competition also renders pressure an effective tool for inducing structural changes that lead to significant changes in magnetic properties. We report a novel pressure-induced reorientation of the Jahn-Teller axis in the $CuF_2(H_2O)_2(pyz)$ system that results in a dramatic change in the magnetic dimensionality. The incorporation of similar magnetic systems into conducting charge transfer salts will be discussed.



Pressure induced changes in $CuF_2(H_2O)_2(pyz)$ as seen in x-ray diffraction (left) and magnetic data (right).

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[1] J. Manson *et al.*, Chem. Commun. (2006) 4894; [2] J. Manson *et al.*, Chem. Mater. 20 (2008) 7408.
[3] J. Manson *et al.*, J. Am. Chem. Soc. 131 (2009) 6733.