Effects of Pressure on the Magnetic Properties of Prussian Blue Analogue Heterostructures

MARCUS K. PEPRAH, MARK W. MEISEL, Dept. Physics and NHMFL, Univ. Florida, CARISSA H. LI, DANIEL R. TALHAM, Dept. Chemistry, Univ. Florida — Magnetic studies on the Prussian blue analogues (PBAs), Li$_x$Cu[Fe(CN)$_6$]$_y$·$m$H$_2$O (CuFe-PBA) and Li$_k$Ni[Cr(CN)$_6$]$_l$·$n$H$_2$O (NiCr-PBA), as well as CuFe@NiCr-PBA core-shell heterostructures, have been conducted under pressures ranging from ambient to $\approx$ 1.4 GPa and at temperatures of 2 - 90 K. Our results for the single phase CuFe-PBA indicate robust magnetic properties under the range of pressures studied: a $T_c$ of 20 K was observed at all pressures. However, our pressure studies of single phase NiCr-PBA are consistent with the results of Zentková et al. up to 1 GPa. At pressures above 1.0 GPa, the decrease in magnetization is accompanied by a decrease in the $T_c$, an indication of changes in the superexchange value, an effect not reported by Zentková et al. Lastly, our results on the effects of pressure on the magnetic properties of heterostructured PBAs, specifically CuFe@NiCr-PBA, will be presented.

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