Photoinduced magnetization in nanometer scale heterostructures of Prussian blue analogues

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Nanometer scale heterostructures of Prussian blue analogues lead to new phenomena not observed for the constituent bulk phases. A striking example [1] is the ABA thin film heterostructure comprised of ferromagnetic $Rb_{0.8}Ni_{4.0}[Cr(CN)_6]_{2.9}\bullet nH_2O$ (Ni-Cr PBA) and the photomagnetic $Rb_{0.7}Co_{4.0}[Fe(CN)_6]_3\bullet nH_2O$ (Co-Fe PBA). The films experience a significant increase in the temperature, from 18 K to 75 K, at which large persistent photoinduced changes in magnetization occur. The behavior results from a new mechanism for inducing magnetization changes in molecule-based magnetic materials using light. Light induced structural changes in the Co-Fe PBA layer couple to the adjacent magnetic network. The behavior results from the ability to couple the two materials at the nanometer length scale. In general, achieving nanoscale heterostructures of molecule-based networks and solids requires new synthetic approaches and this system along with other thin film and nanoparticle [2] examples will be discussed.

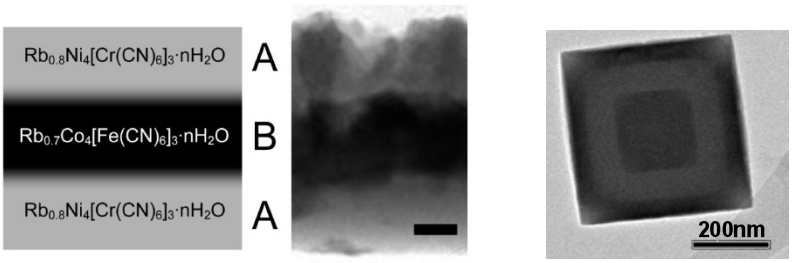

Figure 1. Left: Scheme and TEM cross section of an **ABA** heterostructured thin film of two Prussian blue analogues. The scale bar is 100 nm.[1] **Right:** TEM image of a **BAB** heterostructured particle of the same.

References

1. D. M. Pajerowski et al., *J. Am. Chem. Soc.* **2010**, *132*, 4058-59.
2. M. F. Dumont et al., *Inorg. Chem.* **2011**, *50*, 4295-4300.