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Magnetic Exchange Interactions in Long Range Ordered Diluted Organometallic Semiconductors[1] NAVEEN RAWAT, LANE MANNING, MADALINA FURIS, University of Vermont — Exchange Interactions in diluted organometallic crystalline thin films of Phthalocyanines made of a mixture of organosoluble derivatives of metal-free (H_2Pc) molecule and MnPc is investigated. The tuning of optical and magnetic properties in organometallics is driven by their emergence in optoelectronic applications involving flexible electronics. Thin films with metal to metal-free Pc ratios ranging from 1: 1 to 1:10 were fabricated using solution processing that produces macroscopic grains. In the case of Mn-Pc, our previos measurements showed enhanced hybridization of ligand π-electronic states with the Mn d-orbitals as well as indirect exchange interaction similar to that of RKKY type exchange. The evolution of Zeeman splitting of specific MCD-active states resulted in enhanced effective π-electrons g-factors, analogous to diluted magnetic semiconductors (DMS) systems. Recent Variable temperature Magnetic Circular Dichroism (VTVH-MCD) measurements has now revealed that the exchange interaction is Antiferromagnetic. Recent MCD data for mixed derivatives will be presented along with their temperature dependance that further probes this exchange interaction.

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