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Magnetic Behavior of 1D-Ferromagnetic Fe Chains in FePc/H_2Pc Organic Superlattices[1] CARLOS MONTON, University of California-San Diego, THOMAS GREDIG, California State University-Long Beach, ALI BASARAN, ILYA VALMIANSKI, IVAN SCHULLER, University of California-San Diego — This work reports on the structural and magnetic properties of iron-phthalocyanine (FePc)/ metal-free-phthalocyanine (H_2Pc) superlattices. FePc has a divalent Fe^{2+} ion in the center of the molecule that forms quasi one-dimensional (1D) chains when the flat molecules are stacked. These 1D chains exhibit two magnetic regimes; ferromagnetic order below 5K due to inter-chain interactions, and paramagnetic order between 5K and 25K due to short order intra-chain interactions. H_2Pc is a non-magnetic molecule in which, instead of a metal ion, two hydrogen atoms occupy the center of the molecule. We have grown FePc/H_2Pc superlattices, in which we controlled the alignment of the Fe chains (i.e. perpendicular or parallel to the substrate) by the growth conditions and through the choice of substrate. Additionally we controlled the Fe chain lengths by the thickness of the FePc layer. We have found that reducing the Fe chains length from 70 to 5 atoms increases substantially the coercive field. We will correlate the observed magnetic behavior with structural information obtained from x-ray diffraction.

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