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Magnetic Behavior of quasi-1D-Ferromagnetic Fe Chains in Metallo-Organic Superlattices[1] C. MONTON, Univ of Texas, San Antonio, A. C. BASARAN, I. VALMIANSKI, Univ California, San Diego, T. GREDIG, California State University, Long Beach, D. ALTBIR, V.. L. CARVALHO-SANTOS, Universidad de Santiago de Chile, IVAN K. SCHULLER, Univ California, San Diego — We report structural and magnetic properties of metallo-organic iron-phthalocyanine (FePc) / metal-free-phthalocyanine (H2Pc) superlattices. H2Pc is a weak diamagnetic molecule in which, instead of a metal ion, two hydrogen atoms occupy the center of the molecule. Due to molecular stacking, the divalent Fe(II) ion of FePc forms quasi one-dimensional (1D) chains. These Fe chains can be oriented either parallel or perpendicular to the substrate based on the choice of the substrate. These quasi-1D chains exhibit two magnetic regimes: ferromagnetic-like order below 5K, and nontraditional paramagnetic order (nonlinear behavior with decreasing saturation intensity with temperature) between 5 and 40 K. We have found that reducing the average Fe chains length from 70 to 7 Fe ions substantially increases the coercive field. We discuss the magnetic behavior of quasi-1D Fe chains as a function of the chains length and we correlate the observed magnetic behavior with structural information obtained from x-ray diffraction and Monte Carlo based micromagnetic simulations.

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