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Study of the Molecular Arrangement of the Metallo-organic Molecule Copper Phthalocyanine on Graphene through Electronic Transport, Atomic Force and Transmission Electron Microscopy[1] FRANCISCO RAMIREZ, PATRICK BARFIELD, MAYA MARTINEZ, California State University, Long Beach Department of Physics and Astronomy, HO CHAN, CHRIS REGAN, University of California Los Angeles Department of Physics and Astronomy, THOMAS GREDIG, CLAUDIA OJEDA-ARISTIZABAL, California State University, Long Beach Department of Physics and Astronomy, DR. OJEDA'S NANOELECTRONICS GROUP TEAM, UCLA REGAN RESEARCH GROUP COLLABORATION, GREDIG MOLECULAR THIN FILMS LAB COLLABORATION
— While the last decade and a half has seen great strides in exploiting graphene's unique electronic properties; more recent years have focused on inducing and tuning functionalities derived from strong electronic correlations, spin-orbit coupling by building heterostructures with two-dimensional materials. Here, we present electronic transport measurements as well as transmission electron microscopy (TEM) and atomic force microscopy (AFM) characterization of a hexagonal boron nitride/graphene/copper phthalocyanine (h-BN/Gr/CuPc) heterostructure. Copper phthalocyanine is a paramagnetic metal-organic molecule consisting of 32 carbons, 16 hydrogens, 8 nitrogens, and a central copper atom. The molecular arrangement of CuPc is known to be highly dependent on the interaction with the substrate and the temperature during deposition. We have observed a marked temperature dependence of the differential conductance of the h-BN/Gr/CuPc device that may be attributed to the rearrangement of the metallo-organic molecules on graphene at different temperatures.

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Francisco Ramirez
California State University, Long Beach Department of Physics and Astronomy

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