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Novel spintronic effects and nanoscale friction of Co-TBrPP/GNR/Au(111) heterostructures YANG LI, Center for Nanoscale Materials, Argonne National Laboratory/Ohio University, KYAW ZIN LATT, Ohio University, ANH TUAN NGO, Materials Science Division, Argonne National Laboratory, ANDREW DILULLO, YUAN ZHANG, BRANDON FISHER, Center for Nanoscale Materials, Argonne National Laboratory, PETER ZAPOL, Materials Science Division, Argonne National Laboratory, SAW-WAI HLA, Center for Nanoscale Materials, Argonne National Laboratory/Ohio University — We synthesize heterostructures formed by cobalt-porphyrin (Co-TBrPP), graphene nanoribbon (GNR) and Au(111) substrate, and investigate topography, tribology and electronic properties of heterostructures using low temperature ultra high vacuum scanning tunneling microscopy (STM), tunneling spectroscopy, and atomic/molecular manipulation schemes. GNRs are formed by fusing 10,10'-dibromo-9,9'-bianthryl molecules on a Au(111) surface. Due to a weak binding, the Co-TBrPP molecules are mobile on GNR. The lateral manipulation scheme using the STM tip is employed to investigate the diffusion of the molecule on this surface. Guided by the edges of the GNR, the molecules diffuse in one-dimensional paths. Ultralow friction between Co-TBrPP is discovered and compared with the friction between Co-TBrPP and Au(111) substrate. We will also discuss novel spintronic effects of Co-TBrPP on GNR measured by using tunneling spectroscopy and spectroscopic mapping. We acknowledge the support of DOE SISGR grant: DE-FG02-09ER16109.

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