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Scanned Probe Measurements of Graphene on Ferroelectrics

SCOTT SCHARFENBERG, RUIJUAN XU, CHRISTOPH BAEUMER, MOON-SUB SHIM, LANE MARTIN, NADYA MASON, University of Illinois at Urbana-Champaign — We present results on scanned probe measurements of graphene and few-layer graphite (FLG) on ferroelectric thin films. The graphene was mechanically exfoliated onto the $\text{PbZr}_{0.2}\text{Ti}_{0.8}\text{O}_3$ and other ferroelectric films, and its topography and polarization were characterized using atomic force microscopy, Kelvin Probe (surface potential) Force Microscopy, and Piezoresponse Force Microscopy. We discuss how graphene can be used as a top electrode for ferroelectric materials, as changing the potential of the graphene can cause the ferroelectric region beneath it to switch polarization. We demonstrate that the change in polarization is reversible. We also show how the surface potential of FLG on PZT depends on the number of layers of graphene. *The authors acknowledge Grant DMR-1124696, Sub-Award 235743-3668.

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