Abstract Submitted
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Templated Functionalization of Epitaxial Graphene[1] MICHAEL BEDZYK, JONATHAN EMERY, GAVIN CAMPBELL, SUMIT KEWALRAMANI, JUSTICE ALABOSON, XIAOLONG LIU, ITAMAR BALLA, MARK HERSAM, Northwestern Univ — Nanoscale control and integration of disparate materials on graphene is a critical step towards the development of graphene-based electronics and sensors. Among different graphene substrates, epitaxial graphene (EG) on SiC provides several advantages for functionalization, including high electronic quality, tunable substrate coupling, wafer-scale processability, and crystalline ordering that can template commensurate growth. Exploiting the wafer-scale registry of EG on SiC to template self-assembly and heterostructure materials; we have demonstrated multiple avenues toward functionalization that each offer distinct modifications to the electronic and chemical properties of the underlying graphene. The local functionalized structure and electronic nature is revealed through scanning tunneling microscopy (STM) and atomic force microscopy (AFM). The precise multi-length scale structure at and below the top surface layer is determined via simultaneous grazing incidence small- and wide- angle X-ray scattering (GISAXS/GIWAXS), which gives the relative orientations of the in-plane lattice vectors of the EG, SiC, and functionalized material. We used this scan-probe/X-ray scattering method to examine systems of epitaxial MoS2 and organically templated OPA nanowires on EG/SiC(001).

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