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Rotational homogeneity in graphene grown on Au(111)[1] JOSEPH WOFFORD, UC Berkeley, Lawrence Berkeley National Lab, ELENA STARODUB, Sandia National Laboratories, ANDREW WALTER, Advanced Light Source, LBNL, and Fritz-Haber-Institut der Max-Planck-Gesellschaft, SHU NIE, Sandia National Laboratories, AARON BOSTWICK, Advanced Light Source, LBNL, NORMAN BARTELT, KONRAD THÜRMER, Sandia National Laboratories, ELI ROTENBERG, Advanced Light Source, LBNL, KEVIN MCCARTY, Sandia National Laboratories, OSCAR DUBON, UC Berkeley, Lawrence Berkeley National Lab — The set of properties offered by the (111) surface of gold makes it intriguing as a platform on which to study the fundamental processes that underpin graphene growth on metals. Among these are the low carbon solubility and an interaction strength with graphene that is predicted to be smaller than most transition metals. We have investigated this synthesis process using low-energy electron microscopy and diffraction to monitor the sample surface in real time, and found that the resulting graphene film possesses a remarkable degree of rotational homogeneity. The dominant orientation of the graphene is aligned with the Au lattice, with a small minority rotated by 30 degrees. The origins of this in-plane structuring are puzzling because angularly resolved photo-emission spectroscopy and scanning tunneling microscopy experiments both suggest only a relatively small interaction between the two materials. Finally, the implications of these findings for the growth of high structural-quality graphene films are discussed.

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