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Growth and Characterization of Ultrathin Epitaxial Graphite films on Silicon Carbide TIANBO LI, ASMEROM OGBAZGHI, XUEBIN LI, ZHIMIN SONG, CLAIRE BERGER, WALT DE HEER, PHILLIP FIRST, Georgia Institute of Technology — Ultrathin graphite films grown on 4H/6H SiC (0001) surface were investigated through Auger electron spectroscopy, LEED and STM. Graphite films, 1-6 graphene layers thick, were grown on both the Si- and C-terminated faces via thermal desorption of silicon. Film thickness was measured by modeling the Si:C Auger intensities. The $6\sqrt{3} \times 6\sqrt{3}$ LEED pattern on SiC (0001) surface after annealing above 1250°C can be explained by double-scattering theory with a 6×6 surface corrugation grating on both the graphite and the SiC. STM on the graphitized surface shows “ 6×6 ” domains typically 50 nm in size. Images indicate that the graphite films are continuous over substrate steps, but differences in the local electronic structure have been found for adjacent domains via STS. Magnetoconductance measurements on Hall bars created from these films demonstrate that the graphene/SiC system could be a promising platform for new integrated ballistic-carrier devices based on nano-patterned epitaxial graphene.

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