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Interface Studies of Graphene layers on SiC thin films and bulk SiC(0001) ANDREAS SANDIN, J.L. TEDESCO, NC State University, R.J. NEMANICH, Arizona State University, J.E. (JACK) ROWE, NC State University — A multi-method approach is described based on the well-known high temperature annealing procedure that converts SiC into thin layers of graphite called graphene and has been applied to bulk 6H-SiC(0001) as well as epitaxial thin films of 3C-SiC. Atomic Force Microscopy (AFM) measurements of epitaxial SiC on Si(100) used an UHV Omicron AFM/STM/LEED/Auger multi-probe system. Initial AFM and STM measurements show narrow domains of ∼150 nm dimension that have an Auger electron Spectroscopy (AES) signature confirming the formation of graphene on the SiC surface. Our AES measurements show a weak Si KLV transition at ∼ 1623 eV which can be used to determine the layer thickness of graphene which is typically ∼ 10 Å. Low Energy Electron Diffraction (LEED) also confirms the well-known (6x6) pattern of SiC + graphene reported earlier by several groups. We find that the conversion temperature appears to be somewhat lower (∼ 1050 – 1080 $^{\circ}$C) for films of SiC on Si(100) than for bulk SiC (0001) surfaces. This is possibly due to surface dislocations formed during the epitaxial growth process with very large lattice mismatch between SiC and the Si substrate, which provide additional diffusion sites and paths for the surface segregation reaction that forms the graphene layer.

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