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SiC structuring and step bunching for C-face epitaxial graphene growth JOHN HANKINSON, Georgia Tech, YIKE HU, MING RUAN, BAIQIAN ZHANG, CLAIRE BERGER, WALT DE HEER — Recent research at Georgia Tech has focused on understanding and improving the epitaxial graphene growth process. Electronic experiments have demonstrated the excellent properties that high quality epitaxial graphene can posses when grown by the confinement controlled sublimation (CCS) method in an induction furnace [1]. Here we focus on the mechanisms at work in the early stages of graphitization. Experimental observations of C-face epitaxial graphene growth have revealed that when step-pinning defects are present they seem to act as preferential graphene nucleation sites. In addition we have observed preferential graphene growth on silicon carbide sidewalls and mesas. Ongoing work seeks to take advantage of the correlation between silicon carbide structure and graphene growth by pre-patterning the SiC substrate in order to better control the graphene grown on it. With CCS growth we have created flat graphene regions extending over tens of microns with RMS roughness below 2.5 angstroms. Growth results and electronic measurements on graphene grown on structured SiC mesas will be presented.

[1] R. Ming et al. Materials Science and Engineering – Reports (submitted)

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