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Temperature-dependence of Epitaxial Graphene Formation on SiC(0001)[1] LUXMI LUXMI, NISHTHA SRIVASTAVA, PATRICK FISHER, RANDALL FEENSTRA, Carnegie Mellon University, JAKUB KEDZIERSKI, MIT Lincoln Laboratory, YUGANG SUN, Argonne National Laboratory, GONG GU, Sarnoff Corporation — The formation of epitaxial graphene on SiC(0001) (the *Si-face*) is studied using atomic force microscopy, Auger electron spectroscopy, low energy electron diffraction/microscopy, Raman spectroscopy, and electrical measurements. Starting from hydrogen-etched surfaces, graphene formation by vacuum annealing is observed to begin at about 1150 $^\circ$C, with the overall step-terrace arrangement of the H-etched surface being preserved but with significant roughness (pit formation) on the terraces. At temperatures near 1350 $^\circ$C, the surface morphology changes into relatively large flat terraces covered with several layers of graphene and containing a few large pits, with the terraces separated by step bunches. On the terraces the graphene thickness varies by typically ± 1 monolayer. At higher temperatures the graphene film is observed to buckle and break up, presumably due to thermal mismatch with the SiC. Field-effect mobilities as high as 4200 cm^2/Vs for few-layer graphene films are found.

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