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Controlled growth of monolayer graphene on silicon carbide in argon atmosphere[1] DAVID TORRANCE, DAVID MILLER, HOLLY TINKEY, EVAN GREEN, MADELEINE PHILLIPS, PHILLIP FIRST, Georgia Institute of Technology — Controlled thermal decomposition of silicon carbide is so far the most effective method for growing graphene epitaxially and at the wafer scale. In this work we study the graphenization of SiC(0001) and SiC(000$\bar{1}$) as a function of ambient argon pressure and temperature in a custom-built ultrahigh vacuum (UHV) induction furnace. In-situ characterization by both Auger electron spectroscopy and low-energy electron diffraction (LEED) was used to determine the pressure-temperature "phase boundary" for the formation of monolayer graphene. Sample quality was further assessed ex-situ using a variety of techniques such Raman spectroscopy and scanning tunneling microscopy. The effect of the inert argon overpressure was modeled numerically with a simple kinetic growth theory.

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