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Nucleation of uniform mono- and bilayer epitaxial graphene on SiC(000$\bar{1}$)[1] XIAOSONG WU, RUI ZHANG, Department of Physics, Peking University, YUNLIANG DONG, Department of Physics, Guangxi Normal University, SHUAI GUO, Department of Physics, Peking University, WENJIE KONG, Department of Physics, Guangxi Normal University, ZHIMIN LIAO, DAPENG YU, Department of Physics, Peking University — Early stage of epitaxial graphene growth on SiC(000$\bar{1}$) has been investigated. Using the confinement controlled sublimation (CCS) method, we has achieved well controlled growth and been able to see the formation of mono- and bilayer graphene islands. The growth features reveal the intriguing growth mechanism. In particular, a new "stepdown" growth mode has been identified. Graphene can propagate tens of micrometers across many SiC steps, while, most importantly, step bunching is avoided and the initial regular stepped SiC surface morphology is preserved. The stepdown growth demonstrates a route towards uniform epitaxial graphene in wafer size without sacrificing the initial substrate surface morphology.

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