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Low Temperature Graphene Growth by Down-Stream Chemical Vapor Deposition[1] LOLA BROWN, MARK LEVENDORF, CHAD HUNTER, JIWOONG PARK, Cornell University — Integration of high quality graphene directly onto the surface of metal provides a novel way of controlling the functionality of metal surfaces. This can be used to control the chemical and physical surface interactions and enhance energy transfer through the surfaces, thus allowing for new sensors, flexible electronic devices and better electrodes for organic photovoltaics. However, the implementation of a pristine graphene layer in patterned devices is currently limited, due to the high temperature growth (∼1000 C) and contamination of the graphene surfaces during transfer. This work presents graphene grown at low temperatures (below 750 C) using down-stream chemical vapor deposition (DS-CVD), where a metallic growth substrate is positioned down-stream from the CVD furnace "hot zone". High quality graphene is produced using long growth times (∼ 60 minutes) and low gas flow rates. We study graphene quality and grain structure using Raman spectroscopy and dark-field transmission electron microscopy (DF-TEM). We demonstrate the strength of this technique by growing graphene on thin and micro patterned copper films, and three dimensional structures.

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Lola Brown
Cornell University

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