

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Catalyst-assisted thermal CVD syntheses of large area uniform mono- and few-layer graphene¹ SREEKAR BHAVIRIPUDI, MIT Department of Electrical Engineering and Computer Science (RLE), ALFONSO REINA, MIT Department of Materials Science and Engineering, JING KONG, MIT Department of Electrical Engineering and Computer Science (RLE) — Catalysts with carbon solubilities varying from low to intermediate solubilities were utilized to synthesize large area uniform mono- and few-layer graphene employing catalyst-assisted thermal CVD at both ambient and low pressures. Our results demonstrate that both APCVD and LPCVD from a low carbon solubility catalyst resulted in uniform growth of monolayer graphene. Uniform growth of multi-layer graphene was observed while employing catalysts with intermediate carbon solubility in a LPCVD process that is in contrast to previous reports using APCVD process. In an APCVD process (for low solubility catalysts such as Copper), the graphene synthesis at high temperatures (~ 1000 °C) proceeds in mass-transport limited regime, and in a LPCVD process, proceeds in a surface-reaction limited regime. The role of kinetic factors in graphene growth using APCVD and LPCVD processes would be discussed with reference to aforementioned results.

¹This work was supported partially by the NSF CAREER Award (DMR-0845358) and by the MRSEC Program of the NSF (DMR - 0819762).

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Date submitted: 11 Dec 2009

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