Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

High-Throughput, Ultrafast Synthesis of Solution Dispersed Graphene via a Facile Hydride Chemistry NIHAR MOHANTY, ASHVIN NAGARAJA, JOSE ARMESTO, VIKAS BERRY, Kansas State University — Graphene's superior electrical, optical & mechanical characteristics and its continuously growing applications require concomitant development of graphene-processing-technology. In this talk, we will demonstrate the ability of sodium hydride to act both as a reducing agent and as a deprotonator of methanol, to instantaneously (in few seconds) reduce methanol dispersed graphene-oxide (GO) to reduced graphene oxide (RGO) sheets while simultaneously deprotonating methanol to methoxy ions, which then stabilize the RGO sheets in the methanol with a yield of $\sim$ 68 %. This novel chemistry is effective in producing RGO with a high ratio of sp^2 to sp^3 carbon densities, where the average sp^2 domain size increases from 4 nm^2 to 12.25 nm^2 after reduction. The bilayer RGO sheets produced from this method exhibit carrier mobilities of 100-600 $cm^2V^{-1}S^{-1}$. The high-throughput processing, high-stability of the RGO dispersion, and the benignity & low-cost of the reagents involved will enable expedited research and incorporation of high-quality graphene into next-generation graphene technologies & applications.

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Date submitted: 25 Nov 2009 Electronic form version 1.4