

Abstract Submitted  
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**Mechanical and Electrical Properties of Polycrystalline Graphene**

CARLOS RUIZ-VARGAS, AREND VAN DER ZANDE, PINSHANE HUANG, WILLIAM WHITNEY, MARK LEVENDORF, JOSHUA KEVEK, SHIVANK GARG, JONATHAN ALDEN, DAVID MULLER, PAUL MCEUEN, JIWOONG PARK, Cornell University — Graphene grown by chemical vapor deposition (CVD) has enabled large scale fabrication of graphene-based devices [1]. We apply transmission electron microscopy and AFM techniques to identify individual grain boundaries [2]. This further allows the direct investigation of mechanical and electrical properties of polycrystalline graphene in correlation with its grain structure. We used atomic force microscopy in order to induce and image tearing along individual grain boundaries and find a decreased mechanical strength in CVD graphene compared with pristine exfoliated graphene [3]. Our electrical measurements of CVD graphene devices show that charge mobility is sensitive to different growth conditions. However, we found that average grain size is not directly correlated with the charge mobility, suggesting that grain boundaries are not necessarily a dominating factor.

[1]. Li, X. *et al. Science* **2009**, 1312-1314.

[2]. Huang, P *et al. arxiv* **2010**, 1009.4714v1.

[3]. Lee, C. *et al. Science* **2008**, 385-388.

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