Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

STM and STS studies of CVD grown graphene nanoribbons XIAOTING JIA, MIT, MINGHU PAN, CNMS, ORNL, SREEKAR BHAVIRIPUDI, MIT, VINCENT MEUNIER, Department of Physics, Applied Physics, and Astronomy, Rensselaer Polytechnic Institute, JING KONG, MILDRED DRESSELHAUS, MIT — Graphene nanoribbons (GNRs) are quasi one dimensional structures which have unique transport properties, and have a potential to open a bandgap at small ribbon widths. They have been extensively studied in recent years due to their high potential for future electronics applications. We have experimentally found some GNRs in our CVD grown graphene layers. In this work, we investigated the morphology and electronic properties of the GNRs on top of a graphene layer transferred to a SiO_2 substrate by using scanning tunneling microscopy. Our results suggest that these GNRs have a surprisingly high crystallinity with one side folded. Atomic resolution images were obtained on the folded layer and the bottom layer of the GNR, which enables clear identification of the chirality for both layers. By combining with theoretical modeling we conclude that a (5,7) line defect exists at the zone of maximum curvatures to help reducing the strain energy of the folding. Low temperature spectroscopic measurements suggest that different electronic states may exist at GNR edges, when compared to the ribbon interior regions.

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Date submitted: 28 Nov 2010 Electronic form version 1.4