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Abstract Submitt

for the MAR16 Meeting of
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Oxygen-Activated Growth and Bandgap Tunability of Large Single-Crystal Bilayer Graphene YUFENG HAO, JAMES HONE, columbia univerrisity, RODNEY RUOFF, UNIST, LUIGI COLOMBO, Texas Instruments, THE HONE GROUP TEAM — Distinct from zero-bandgap single-layer graphene, Bernal-stacked bilayer graphene (BLG) is a semiconductor whose bandgap can be tuned by a transverse electric field, making it a unique material for a number of electronic and photonic devices. In this presentation, we will focus on the most recent progress in the identification of new growth mechanisms towards large-area single-layer BLG on Copper: multiple control experiments and first-principles calculations are used to support the proposed mechanisms. We emphasize that trace amount of impurities on metal surface are critical to initiate graphene growth and affect the growth kinetics. Furthermore, contrary to the traditional viewpoint that graphene growth is always surface-limited process, our new observations strongly suggest that metal bulk plays a role to feed carbon species for graphene growth. State-of-the-art structural characterizations and electrical transport measurements of the CVD graphene layers will be presented as well.

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