Abstract Submitted
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A novel polymer-free transfer technique for high mobility graphene field effect transistors (FET)[1] WEI-HSIANG LIN, Caltech, SHANG-YI LIU, National Taiwan University, CHEN-CHI HSU, Caltech, JIEH-I TAUR, National Taiwan University, DAVID A. BOYD, Caltech, CHIH-I WU, National Taiwan University, NAI-CHANG YEH, Caltech, NAI-CHANG YEH TEAM, CHIH-I WU COLLABORATION — We demonstrate a novel polymer-free method that can routinely transfer large-area graphene to any substrates and preserve the optimal properties of as-grown samples as compared to the graphene transferred with conventional polymer-assisted methods. We have also developed a one-step method that employs plasma-enhanced chemical vapor deposition for rapidly producing superior quality, large-area, monolayer graphene on Cu at low temperature (LT). Combining these two techniques, we find excellent properties of the LT-CVD grown graphene based on studies of Raman spectroscopy, XPS, UPS and STM. We have also investigated the effect of various substrates and PMMA residuals on the performance of the LT-CVD grown graphene FETs by constructing four types of devices (graphene/SiO_2 FETs, graphene/BN FETs, PMMA residuals/ graphene/SiO_2 FETs, and PMMA residuals/graphene/BN FETs). The LT-CVD grown graphene combined with the polymer-free transfer technique has achieved an electrical mobility $\sim$ 60,000 cm^2 V^{-1} s^{-1}, which may be further improved to approaching the ideal value of pristine graphene.

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