Photocurrent in tri-layer graphene photodevices

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Abstract

Tri-layer graphene can have two stacking orders, ABA (Bernal), and ABC (Rhombohedral) staking, which have different energy band structures near the K point. Optical and electrical properties of the boundary between ABA and ABC stacking are interesting in studying the fundamental science of graphene. The Raman spectra of ABA- and ABC- stacked tri-layer graphene have been reported[1,2], but photocurrent in those tri-layer has not been studied. We measured photocurrent in ABA- and ABC-stacked tri-layer graphene photodevices as a function of the back-gate bias and the incident polarization. The tri-layer graphene photodevices were fabricated by depositing Pd/Au electrodes on exfoliated tri-layer graphene on SiO_2-covered silicon substrates by using e-beam lithography. The ABA and ABC stackings in tri-layer graphene were confirmed by the 2D band of the Raman spectrum. Photocurrent images were taken by scanning a focused laser beam across the photodevice. Raman spectra and photocurrent images were taken simultaneously in order to identify the exact position of the photocurrent, so that we can match the photocurrent and the stacking order where the photocurrent is measured.

References

[1] C. H. Lui et al., Nano lett., **11** (2011) 164.
[2] C. Cong et al., ACS Nano, **5** (2011) 8760.

Figure