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Mechanism of photocurrent generated at a junction between ABA- and ABC-stacked tri-layer graphene MINJUNG KIM, Sogang University, SEON-MYEONG CHOI, Korean Institute for Advanced Study, HO ANG YOON, Konkuk University, SUN KEUN CHOI, JUNG CHEOL KIM, Sogang University, SANG WOOK LEE, Konkuk University, YOUNG-WOO SON, Korean Institute for Advanced Study, HYEONSIK CHEONG, Sogang University — Tri-layer graphene has two stacking orders, ABA and ABC stacking, which have different electronic band structures. We observed photocurrent generated at the ABA and ABC stacking junction in tri-layer graphene and investigated the mechanism of the photocurrent by measuring the back-gate voltage dependence of the photocurrent. In general, there are two mechanisms of photocurrent generated in graphene photodevices without bias; a density of states (DOS) mismatch and the Seebeck coefficient difference. The dominant mechanism of photocurrent at a junction between single- and bi-layer graphene has been suggested as being due to the difference in Seebeck coefficients [X. Xu et. al., Nano lett. 10, 562 (2010).]. Here, we studied the dominant mechanism of the photocurrent in the ABA and ABC stacking junction in tri-layer graphene. If the DOS mismatch is the dominant mechanism, the direction of photocurrent is from ABC to ABA stacking in p-doped tri-layer graphene. On the other hand, if the Seebeck coefficient difference is dominant, the direction of the photocurrent is opposite. In our devices, it has been found that the DOS mismatch is dominant. In addition, we measured the photocurrent at between at a junction single- and bi-layer graphene and bi- and tri-layer graphene for comparison.

Minjung Kim
Sogang University

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