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Resist-free graphene/metal interaction extracted through quantum capacitance measurement R. IFUKU, K. NAGASHIO, T. NISHIMURA, A. TORIUMI, Department of Materials Engineering, Univ. of Tokyo — Understanding of the graphene/metal interaction is crucially important from both scientific and practical viewpoints. In the electric device structure, it is reported that graphene under the metal electrodes maintains the linear dispersion regardless of kinds of metals. In case of graphene grown on metals, on the other hand, the modulation of the linear dispersion strongly depends on kinds of metals, e.g. band modulation occurs on Ni and not on Au. The key issue to elucidate this discrepancy can be the resist residual in the device fabrication process. In this study, the resist-free graphene/metal interaction was studied from the density of states (DOS)–energy relation determined by the quantum capacitance measurement of metal/graphene/SiO_2/n^+-Si stack. Graphene in resist-free contact with Au maintains the linear DOS-energy relation, except near the Dirac point. Graphene contacting Ni shows larger DOS at the Dirac point, resulting in limited gate modulation of E_F in graphene. Resist free process reveals the intrinsic difference in the strength of the graphene/metal interaction (π-d coupling or van der Waals) for Ni and Au.

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