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Spontaneous and Thermally Enhanced Charge Transfer at Graphene-Silica Interface KWANGHEE PARK, Department of Chemistry, Pohang University of Science and Technology, SUNMIN RYU[1], Department of Chemistry, Division of Advanced Materials Science, Pohang University of Science and Technology — Low dimensional carbon materials undergo spontaneous hole doping in the ambient conditions. Thermal annealing enhances the degree of the charge transfer in silica-supported graphene exposed to oxygen and water vapor. In this work, we investigated the mechanisms responsible for the charge transfer using Raman spectroscopy and water contact angle measurements. Mechanically exfoliated graphene samples were annealed at various temperatures in a range of 100 to 1000 ^{o}C to induce the hole doping. While the annealing-induced charge density of graphene increased with increasing annealing temperature up to 700 ^{o}C, it decreased as increasing the temperature further higher. Graphene samples prepared in a low humidity condition lead to significantly decreased hole doping suggesting that water contained in the samples plays a key role. We will propose and discuss a charge transfer mechanism that involves thermal hydroxylation and rehydroxylation of silica surfaces.

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