

Photo-induced chemical change of di-fluoride in the CYTOP doped graphene

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Many efforts have been devoted on chemical modification of graphene layer to modulate its electrical properties. In the previous report, laser irradiation on the CYTOP (Amorphous Fluoropolymer) covered graphene layer induces chemical modification wherein carbon fluoride is formed on the graphene surface. This results in the insulating I-V characteristics, which have been attracting much research interests on it. However, the direct analytical evidence of the fluoride formation on graphene surface is not yet studied.

In this work we investigated what happened on the CYTOP/graphene interface during photon irradiation using spatially resolved photoemission spectroscopy method. It is found that the soft x-ray (614 eV) induces desorption of fluoride atoms from the CYTOP and change di-fluoride form to mono-fluoride. As the photo-induced fluorine desorption is continue strong dipole field generated by initial di-fluoride forms is gradually decreased, resulting in the overall binding energy shift of the C 1s core levels. Both photo-modified CYTOP and CYTOP starts to desorb above 286°C (~ 0.047 eV), which means that no strong chemical interaction between CYTOP and graphene is established.

Keywords: CYTOP, CYTOP doped graphene, di-fluoride, mono-fluoride

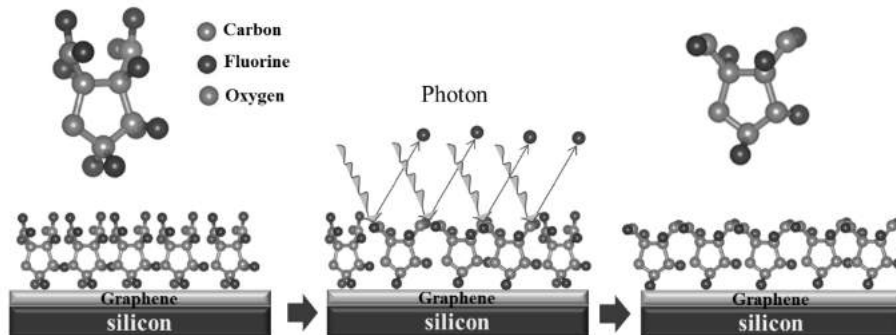


Fig. 1. Schematic views of experimental process of CYTOP doped graphene.