

Liquid and solid phase of water on graphene and graphene oxide using ambient pressure X-ray photoelectron spectroscopy

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The one-atom thickness property of graphene is good for the role of membrane to separate liquid and gas phase in the microscopic utilization. Hydrophobic surface owing to the ordered sp^2 orbitals of carbon makes the limitation in graphene's application, but graphene oxide with the oxygen functional groups behaves better hydrophilic interface than the graphene. The project is to focus on how to identify the relationship of water and carbon/oxygen or structural defect, using graphene and graphene oxide samples. The thermal release of graphene from the type is the method to transfer graphene on stainless steel surface. The other method is the tip-contained electrochemical reduction by scanning electrochemical microscopy (SECM), which partially decreases oxidation degree of graphene oxide. To investigate the water interaction difference between graphene/graphene oxide, ambient pressure XPS and XAS in BL24A have been used in the water gas environment control. The intensity for vapor and liquid phase water is relied on the oxygen-related surface with the function of water gas pressure, where the binding force from oxygen and hydrogen has the higher possibility to bond.