

Conversion of graphite powder to graphene via ozonation treatment in deionized water

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Abstract

Conversion of graphite powder to graphene could be achieved by ozonation treatment of the graphite in deionized water. Microscopic examination of the resultant graphene was carried out using X-ray photoelectron spectroscopic (XPS) analyses conducted in Synchrotron Light Research Institute (SLRI). Transmission electron microscopy (TEM) and Raman spectroscopy were additionally employed for further examination. Based on the high-resolution C1s core-level XPS spectrum, the ratio of C=C (sp^2) to C-C (sp^3) within the resultant graphene could be enhanced by an increase in ozonation treatment time. Meanwhile, bi-layer graphene with morphology of corals-like sheet could also be confirmed by TEM observation. In addition, Raman spectroscopic results suggested that a significant portion of amorphous carbon and defects of graphene could be removed with an increase in the ozonation treatment time. All of consistent experimental results suggested that ozonation treatment of graphite powder in deionized water would be a facile method for preparing graphene with controllable characteristics.

Keywords: Graphene, Graphite powder, Ozonation, XPS, Raman spectroscopy