Preparation of Graphene via Electrochemical Exfoliation Method for Environment Applications

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ABSTRACT

In this research, electrochemical exfoliation process of the graphite as electrode immersed in a sulfuric acid, nitric acid and water (H₂SO₄/HNO₃/H₂O) was used to produce high-quality graphene. The structural and chemical properties of the prepared graphene were studied. XRD shows that the structure of graphene is polycrystalline with preferential orientation in the (002) and (004) direction. Raman spectra showed two intensive peaks Iₐ and I₂D corresponding to 730.01 and 628.04. Fourier transform infrared spectroscopy (FT-IR) spectrum showed the stretching vibration of C=C aromatic ring 1649.19 cm⁻¹ and the stretching vibration from C-H 1456.30 cm⁻¹ bend. Also the oxygen-containing functional groups have been appeared like O-H, C=O and C-O. After preparation of graphene and characterization, environmental testing was conducted to purify the mixture consisting of water and oil. Naked eye noted that the water has been purified from oils, and also water samples have been tested using optical microscopy.