Facile and Green Synthesis of Reduced Graphene Oxide in Supercritical Methanol

Nursanto Eduardus Budi[1,2], 김재훈[1,2,*]
[1]한국과학기술연구원(KIST);
[2]과학기술연합대학원대학교(UST)
(jaehoonkim@kist.re.kr*)

A facile and green method to produce reduced graphene oxide (RGO) nanosheets based on supercritical alcohol (methanol) is described. The obtained RGO nanosheets exhibited high carbon-to-oxygen ratio (up to 11.89, determined by X-ray photoelectron spectroscopy), high electronic conductivity (up to 10,600 S m-1) and a single broad X-ray diffraction (XRD) peak at 25.1 (2Θ angle), verifying the exfoliation of graphitic sheets. Indeed, rapid heating, high reduction power, and extremely fast reaction rate in supercritical alcohol suggests that the RGO nanosheets are capable of effectively removing the oxygen-containing functional groups to produce individual graphene sheets. Furthermore, supercritical alcohols act as a 'green' alternative to other toxic reducing agents.