

Novel method of graphite exfoliation towards synthesis of graphene

Malgorzata Wojtoniszak, Ewa Mijowska

Westpomeranian University of Technology in Szczecin, Pulaskiego 10, 70-322 Szczecin, Poland

mwojtoniszak@zut.edu.pl

Graphene is attracting an increasing research interest due to its amazing properties which may be applied in many fields, such as electronic devices (supercapacitors, lithium ion batteries), biomedicine (biosensors, drug delivery), and many others. However, there is still a huge need to find a method to synthesize graphene in a large scale. Among many methods, chemical exfoliation of graphite has been considered as the most promising way to large-scale production of graphene, where graphite is oxidized to graphene oxide and next reduced to graphene. The most common way to produce graphene oxide is Hummers method, where graphite is oxidized with KMnO_4 and NaNO_3 in concentrated H_2SO_4 . In this study, we propose a novel method of graphite exfoliation. Here, graphite is treated with K_2CrO_4 in the mixture of perchloric and nitric acids to create graphene oxide, which is next reduced with glucose. Furthermore, the obtained materials was sorted according to its size and thickness via density gradient ultracentrifugation (DGU). The materials was characterized with transmission electron microscopy, FT-IR spectroscopy, Raman spectroscopy and XRD.