Graphene Synthesis by Ultrasound Energy Assisted Exfoliation of Graphite in Various Solvents

Betul Gurunlu
Mahmut Bayramoglu

Gebze Technical University Chemical Engineering Department, Kocaeli, Turkey

bgurunlu@gtu.edu.tr

Abstract

Graphene has created an increasing notice thanks to its appealing properties [1]. In this study, graphene was prepared from graphite by a very simple and easy process. The one-step protocol involves conversion of graphite to graphene by sonication in different types of solvents such dimethyl sulfoxide, N,N-Dimethyl formamide, Perchloric acid. The structures and properties of the obtained graphene samples were characterized via UV–vis absorption, and Atomic Force Microscopy spectroscopic techniques. According to the UV-vis spectrums of all graphene products give peak at 265 nm wavelengths that referring sp2 C=C bonds [2], which may be caused by the ultrasonication required for proper suspension using the solution-based process. Also, as a result of AFM analyses, it can be concluded that the obtained graphene samples contain a few layers; while G-DMSO has four layers, G-NNDMF has five layers. It can be understand that DMSO shows better effect on graphite for sonication process. The preparation protocol is simple, easy, eco-friendly.

References

[1] A.K. Geim, K.S. Novoselov, Nat. Mater. 6 (2007) 183.

[2] Johra, F. T., Lee, J. W. and Jung, W. G. Facile and safe graphene preparation on solution based platform. Journal of Industrial and Engineering Chemistry, 20(5), 2014, 2883-2887.

Figures

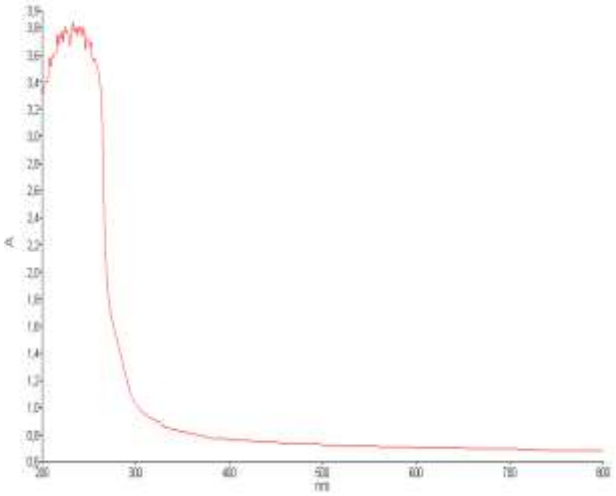

Figure 1: UV-Vis spectra of G-NNDMF

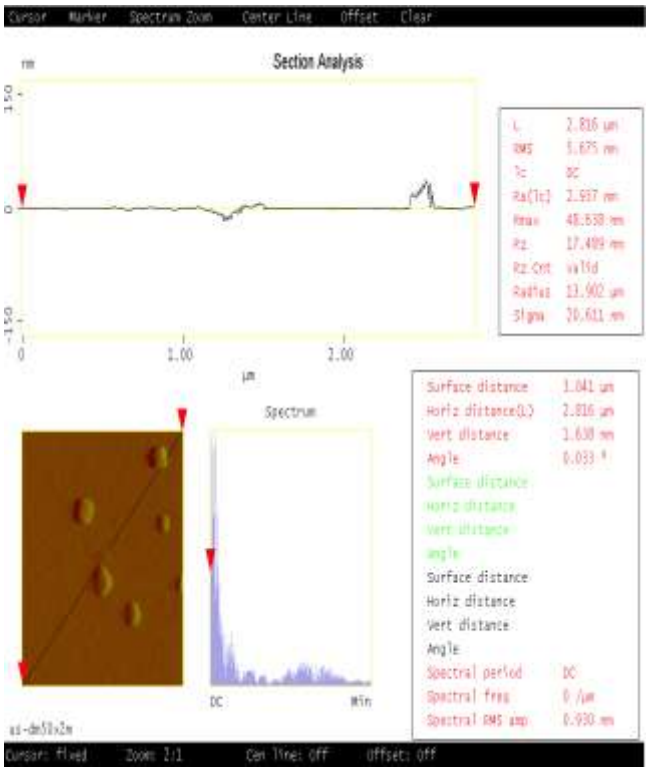

Figure 2: AFM images and line profiles of G-DMSO drop casted onto glass piece indicating homogeneous pristine graphene sheets