Bulk production of few layer azidated graphene

Selene Munoz-Vargas
Marcos Perez-Pucheta, Karl S Coleman
Durham University, Lower Mount Joy, South Rd, Durham, United Kingdom
selene.munoz-vargas@durham.ac.uk

Graphene exceptional properties and applications have been reported countless times. However, in many applications it is necessary to introduce different functional groups to fully exploit graphene properties. A powerful and interesting approach is to use click chemistry since it is simple and effective. This route can provide a way to change the functionality of graphene if it has azide groups attached. On the other hand, electrochemical exfoliated graphene in inorganic salts[1] has proven to produce good quality few-layer graphene flakes and successful graphene azidation has been previously demonstrated in small scale with one single flake[2]. In this work we present the simultaneous exfoliation and functionalization of commercial graphite foil to produce bulk azide-functionalized few-layer graphene. Furthermore, azide groups can react with propargylamine using click chemistry to introduce amine groups. Successful functionalization and exfoliation have been confirmed by X-ray photoelectron spectroscopy (XPS) and atomic force microscopy (AFM) respectively.

References

[1] K. Parvez, Z. S. Wu, R. Li, X. Liu, R. Graf, X. Feng and K. Müllen, J. Am. Chem. Soc., 136 (2014) 6083–6091
[2] W. Li, Y. Li and K. Xu, Nano Lett., 20 (2020) 534-539

Figures

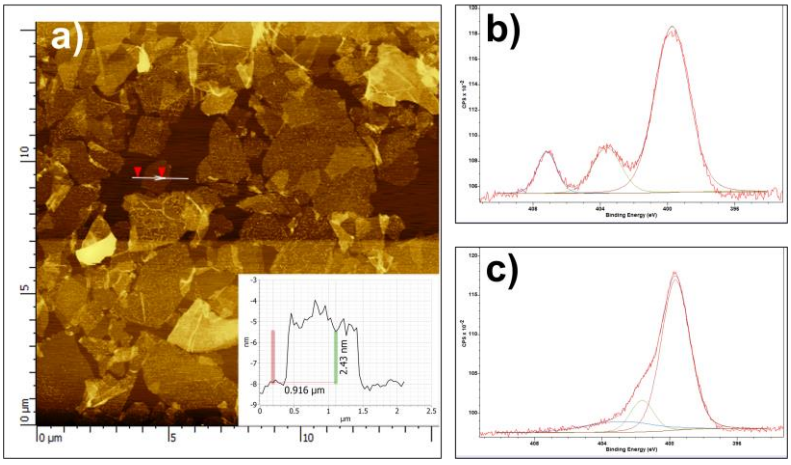

Figure 1: 1a) Thickness measurement by AFM, b) and c) High resolution XPS Nitrogen 1s regions before and after click chemistry, respectively