Functionalization of graphene oxide via gamma-ray irradiation for hydrophobic materials

ABSTRACT

Many of the potential applications of graphene are enhanced by the ability to functionalize its surface chemistry. Despite advances in fabrication methods of hydrophobic surfaces, many of these methods require multistep processes and postchemical treatments. Thus, there is a need to better understand not only how to fabricate them using simple methods but also how various surface properties, such as morphology, chemistry, and roughness, affect surface wettability and stability. This chapter describes general description of hydrophobic surfaces and emphasizes on the functionalization of graphene for hydrophobic materials. The preparation method of the hydrophobic graphene by γ-ray irradiation approach was also described. Gamma-ray radiation was utilized to functionalize graphene oxide (GO) with different chain length alkylamines and tuned the surface properties of GO from hydrophilic to hydrophobic. These will greatly expand the applications of GO in many fields, especially hydrophobic material preparation.

Keywords: Gamma ray; Radiation; Alkylamine; Hydrophobic; Modification