Tailoring graphene reinforced thermoset and biothermoset composites

Nur Bazilah Thalib, Siti Noor Hidayah Mustapha*, Chong Kwok Feng and Rohani Mustapha

1 Faculty of Industrial Sciences and Technology, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Kuantan, Pahang, Malaysia
2 School of Ocean Engineering, Universiti Malaysia Terengganu, 21030, Kuala Terengganu, Terengganu, Malaysia

Abstract

The surge of knowledge among researchers pertaining to the excellent properties of graphene has led to the utilisation of graphene as a reinforced filler in polymer composites. Different methods of graphene preparation, either bottom-up or top-down methods, are important requirements of starting materials in producing reinforced properties in the composites. The starting graphene material produced is either further functionalised or directly used as a filler in thermoset polymer matrixes. An effective interaction between graphene and polymer matrixes is important and can be achieved by incorporating graphene into a thermoset polymer matrix through melt mixing, solution mixing or in situ polymerisation processes. In addition, by taking into consideration the importance of green and sustainable composites, the details of previous work on graphene reinforced bio-thermoset polymer matrixes is discussed. The resultant mechanical and thermal properties of the composites were associated to the chemical interaction between the graphene filler and a thermoset matrix. Exploration for further variations of graphene polymer composites are discussed by taking the reinforcement properties in graphene composite as a starting point.

Keywords: biocomposite; functionalised graphene; graphene filler; graphite; thermoset resin.