

Effect of alkylamine-functionalized graphene oxide on polystyrene matrix for the improved mechanical properties

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Graphene has been expected its applicability in various fields due to its superior properties. In application of graphene as a nano-filler in polymer, the homogeneous dispersion into polymer matrix is the key to use this new material. The solution is resulted from the surface properties of graphene, which has been chemically modified from graphene oxide (GO). The use of the functionalized graphene oxide (FGO) is a promising way in solution process, especially introduction of FGO into low polar organic solvents or low polar polymers usually shows favorable results. Recent studies demonstrated FGO using alkylamines as a functional agent exhibits the broader inter-spacing and lower polarity with extension of functional alkyl groups. In this study, we investigated FGO/polystyrene (PS) nanocomposites. We prepared three FGOs by using different chain length of alkylamines. During the solution blending, FGOs facilitated homogeneous dispersion over PS matrix even at high weight percentage (~10 wt.%) in chloroform. The distinct improvements of the mechanical properties were observed with aspect ratio of FGO in composites.