

Graphite Oxide Flame Retardants

Wei Lu

Department of Mechanical Engineering and Materials Science, Rice University, Houston, Texas, 77098

ABSTRACT: Graphite oxide (GO) is a stack of graphene sheets with oxygen functional groups on their basal planes and edges. It can generate char and carbon dioxide when subjected to high temperature, thus making it a promising flame retardant additive. In this study, GO was blended with thermoplastic polymers (polycarbonate, acrylonitrile butadiene styrene and high-impact polystyrene) and thermosetting polymers (epoxy resin and silicon rubber) for the purpose of evaluating the flammability reduction and materials properties of the resulting systems. The morphology of polymer/GO composites was studied by SEM; the GO was found to be well-dispersed throughout the matrix without formation of large aggregates. Microscale oxygen consumption calorimetry was used to examine the influence of GO on the total heat release and peak heat release rate in all systems. Vertical open flame testing revealed that GO is more effective for inherently flame retardant polymers such as polycarbonate and silicon rubber.