Processing of Polymer-based Nanocomposites: Processing-Structure-Property-Performance Relationships: https://doi.org/10.1007/978-3-319-97792-8

Processing nanocomposites based on engineering polymers: Polyamides and polyimides

Ojijo, Vincent O
Sinha Roy, Suprakash

ABSTRACT:

Although polymer nanocomposites (PNCs) are now a relatively well-established technology, nanoparticles (NPs) such as carbon nanotubes (CNTs) and graphene are opening up new application areas in engineering PNCs. Therefore, research and development is increasingly being undertaken on the processing and performance of these nanocomposites in order to address keys challenges, including nanoscale dispersion in polymer matrices. This chapter discusses the processing techniques used in the fabrication of engineering PNCs. Emphasis is placed on two classes of engineering polymers: (i) polyamides (PAs) and (ii) polyimides (PIs). Similarly, we focus only on a limited number of NPs (clays, CNTs, and graphene). Apart from traditional methods, relatively new manufacturing processes, such as electrospinning and additive manufacturing, are highlighted and their applicability in the fabrication of PA- and PI-based nanocomposites is discussed.