

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

Processing nanocomposites based on commodity polymers

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ABSTRACT:

Nanocomposites consisting of commodity polymers like polyethylene, polystyrene, polypropylene, and polyvinyl chloride have demonstrated good thermomechanical behavior and electrical properties. Common routes for producing polymer nanocomposites (PNCs) with commodity polymers involves either melt mixing, in situ polymerization, or solution mixing. However, the common processing techniques cannot adequately disperse nanoparticles (NPs) in the commodity polymer matrix. The chapter describes various strategies for dispersing NPs in commodity polymers, such as functionalization of the polymer, or preparing a nanocomposite. In addition, this chapter describes the structure–property relationships of commodity polymers after incorporation of NPs, along with their performance for specific applications. Finally, an outlook regarding the challenges, opportunities, and future trends in commodity PNCs is presented, along a summary of the chapter.