Processing of Polymer-based Nanocomposites: Introduction

Synthesis and functionalization of nanomaterials

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Abstract:
“Nanomaterial” and “nanotechnology” have become well-known terms, not only among scientists, engineers, fashion designers, and architects, but also the general public. Owing to their extraordinary and unexpected behavior, nanomaterials have gained tremendous attention in fields such as automotive, electronics, aerospace, healthcare, and biomedical, and have significant potential for many modern advanced technological applications. Nanomaterials have promised to make available products and systems smaller, better, lighter, and faster, which is achieving reality due to the rigorous efforts of scientists and engineers. In this scenario, several kinds of nanomaterials, various synthesis methods and advanced characterization techniques, and many computational models and theories to elucidate experimental results, are being developed by researchers. This chapter introduces state-of-the-art progress in the development of various synthesis strategies and functionalization approaches for producing a wide range of nanomaterials. We also discuss the properties of polymer nanocomposites considering some specific applications.