Polypropylene Nanocomposites Containing 0D, 1D, and 2D Nanoparticles

By

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Abstract

Significant academic and industrial efforts have been made in the past three decades to prepare various types of polymer nanocomposites with the goal being greatly improved physical and mechanical properties for demanding engineering applications. However, little success has been achieved, especially for polyolefins. One of the many difficulties is our inability to achieve consistently good dispersion of nanoparticles in polymer matrices. In some cases, even when there is some evidence of good dispersion of nanoparticles, the level of improvements in physical and mechanical properties are disappointingly small. The above facts point to our lack of fundamental knowledge in regard to structure-property relationship of polymer nanocomposites. In this presentation, examples of polypropylene nanocomposites that exhibit outstanding physical and mechanical properties will be demonstrated based on $CaCO_3$, MWCNT, and synthetic clay. Possible commercial significance of the present findings will also also discussed.