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Studies on the combined effect of multi walled carbon nano tubes (MWCNTs) and maleic anhydride grafted polypropylene (MA-g PP) on the mechanical and thermal properties of polypropylene (PP)

Etakula Nagabhushan¹ and Vuba Kiran Kumar²

¹Osmania University, India

²CIPET, India

Multi- Walled Carbon Nano Tubes (MWCNTs) filled Polypropylene (PP) nano composites were prepared through diluting a PP/MWCNT master batch in a PP matrix by melt compounding with a twin screw extruder. Polypropylene grafted maleic anhydride (MA-g-PP) was used to promote the Carbon Nano tubes dispersion. The effect of PP- g-MA addition on the rheological, mechanical and morphological properties of Nano Composites was assessed for different MWNTs loadings. Scanning Electron Microscopy (SEM) has shown that tubes were distributed reasonably uniformly. A better dispersion and good adhesion between the Nano tubes and PP matrix is caused by wrapping of PP-g-MA on MWNTs. When PP-g-MA is added, dynamic moduli and viscosity further increased compared to PP/MWNT Nano Composites. The rheological percolation threshold dropped significantly. Tensile and flexural moduli and Charpy Impact resistance of the nano composites were also increased by the addition of PP-g-MA. The present study confirms that PP-g-MA is efficient to promote the dispersion of MWNTs in PP matrix and serves as an adhesive to increase their interfacial strength, hence greatly improving the rheological percolation threshold and mechanical properties of PP/MWNT nano composites.

enaaga@yahoo.com