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Enhanced dispersion of multiwall carbon nanotubes in natural rubber latex nanocomposites by surfactants bearing phenyl groups

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Here presented is a systematic study of the dispersibility of multiwall carbon nanotubes (MWCNTs) in natural rubber latex (NR-latex) assisted by a series of single-, double-, and triple-sulfosuccinate anionic surfactants containing phenyl ring moieties. Optical polarizing microscopy, field emission scanning electron microscopy (FESEM), transmission electron microscopy (TEM), and Raman spectroscopy have been performed to obtain the dispersion-level profiles of the MWCNTs in the nanocomposites. Interestingly, a triple-chain, phenyl-containing surfactant, namely sodium 1, 5-dioxo-1,5-bis (3-phenylpropoxy)-3-((3-phenylpropoxy) carbonyl) pentane-2-sulfonate (TCPh), has a greater capacity the stabilization of MWCNTs than a commercially available single-chain sodium dodecyl benzene sulfonate (SDBS) surfactant. TCPh provides significant enhancements in the electrical conductivity of nanocomposites, up to ~10-2 S cm-1, as measured by a four-point probe instrument. These results have allowed compilation of a road map for the design of surfactant architectures capable of providing the homogeneous dispersion of MWCNTs required for the next generation of polymer-carbon-nanotube materials, specifically those used in aerospace technology.

Biography

Azmi Mohamed has completed his PhD from School of Chemistry, University of Bristol, United Kingdom. He is currently Research Fellow in Nanotechnology Research Centre at Universiti Pendidikan Sultan Idris (UPSI). He has published more than 25 papers in reputed journals and has been serving as Deputy Director of International Affairs Division, UPSI.

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