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## Effect of Nanofiller Aspect Ratio on the Properties of Polymer Nanocomposites

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This work focuses on modifying the properties of commercially available acrylic coatings by incorporating nanofillers such as pristine montmorillonite, hydrotalcite, single walled carbon nanotubes (SWNT) and fullerenes with different aspect ratios. Nanofillers were dispersed in acrylic coatings by solution blending. The structure and properties of the nanocomposites were characterized and compared by different techniques. WAXD and morphology study confirmed the formation of nanocomposites with intercalated and partially exfoliated structures. A notable reduction in the thermal degradation of acrylic coatings was observed for SWNT nanocomposites whereas no change was observed for other nanocomposites. Acrylic coating containing ~5 wt% SWNT shows higher tensile strength than the matrix especially along the draw down direction. Acrylic coating containing hydrophilic hadrotalcite and sodium cloisite clays absorbs water vapour and shows less resistance to the water vapour permeability whereas the oriented well dispersed hydrophobic SWNT and fullerene effectively reduced water permeability. It can be concluded that the structure and properties of the nanocomposites greatly depend on the aspect ratio, surface area, orientation and extent of interaction of the nanofillers with polymer matrix.