

CLAY NANOTUBES IN POLYMER COMPOSITES: A ROUTE TO STRONGER, LIGHTER & LESS EXPENSIVE MATERIALS

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ABSTRACT

Halloysite Nanotubes (HNT™) provide a new avenue for the preparation of nanocomposites. Halloysite is a naturally occurring member of the kaolin family of aluminosilicate clays. Its uniqueness is that it exists predominantly in a tubular form with lengths of up to 10 microns and diameters of up to 400 nm rather than the layered platy form of essentially all other clays.

Well-behaved dispersions of HNT in nylon-6, polypropylene, TPO and several varieties of polyethylene have been obtained by standard melt processes. In all cases, improved physical performance has been realized for molded parts. The result is a molded part that is more durable and lighter than a glass fiber reinforced counterpart. In addition, injection molded HNT-containing composite parts exhibit improved surface appearance and reduced extrusion and molding cycle time, relative to glass fiber containing composites.

HNT have also been dispersed in polymer latexes and dispersions at quite high loadings. These polymer and clay dispersions have been coated and produce coatings with a tenfold increase in strength, while maintaining transparency.