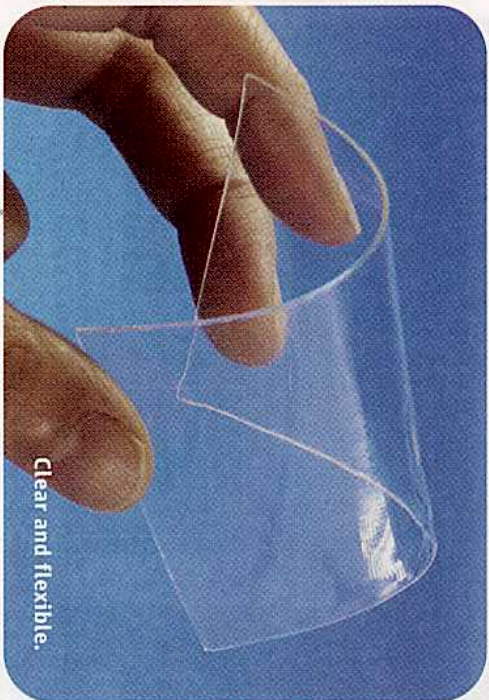


MATERIALS SCIENCE

Stretchy Clay Composites

Clays are considered useful reinforcing materials on account of the individual platelets exposed through exfoliation; these platelets offer a large surface area for chemical bonding. However, the synthesis of a composite material by the addition of large amounts of clay to a polymer is problematic because of dispersion or aggregation effects that lead to poor mechanical or optical properties. Haraguchi *et al.* used gel formation in an aqueous medium to create a composite of hydrophobic poly(2-methoxyethyl acrylate) and hydrophilic hectorite clay. During the polymerization, the clay platelets were excluded from the polymerization. Once dried, the clay shells comprised a three-dimensional network, which the authors structurally characterized using transmission electron microscopy.

A surprising feature of the composites was the ability to undergo huge elongations when subjected to stress. After an initial irreversible necking deformation, subsequent applied large strains were shown to be reversible, with good shape recovery observed on release. The composites were also transparent, with greater than 90% light transmission independent of clay concentration (up to 30 weight %). Unlike many clay composites, these materials did not reswell on exposure to water, nor did they dissolve in organic solvents that could solubilize the pure polymer. — MSL



Clear and flexible.