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## Performance of halloysite nanotube/poly(styrene-co-methylmethacrylate) nanocomposite coatings for the protection of soda-lime glass

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### Abstract

Polymer-based coatings for the protection of glass surfaces are used considerably in the construction and automotive industries. This research article focuses on the potential use of halloysite nanotubes (HNT)/Poly(Styrene-co-Methylmethacrylate) (PS-co-PMMA) nanocomposites as coatings for the protection of soda-lime glass. The effect of HNT content and coating thickness on the spectral properties of the glass, morphology, surface-wettability, and thermo-mechanical properties of the nanocomposite coatings were investigated and reported. The inherent spectral behaviour of glass was not altered significantly by the coatings when the content of HNTs in coatings was  $\leq 5$  wt %. The coated glasses also exhibited a slight increase in the solar skin protection factor (SSPF), but notable improvement in the solar material protection factor (SMPF) when the HNT content was high. Thermogravimetric analysis (TGA) revealed that the HNT/PS-co-PMMA nanocomposite coatings possess excellent thermal stability compared to the neat copolymer. The surface wettability of coated glasses by water droplets decreased substantially due to coatings as evident from contact angle measurements. The HNT/PS-co-PMMA nanocomposites also displayed enhanced tensile strength and scratch resistance with increasing HNT content up to 5 wt%. Overall the performance of the coated glass was enhanced by the coatings.

**Keywords:** Halloysite; Polymer Coatings; Ultrasonication; Hydrophobicity; SSPF; SMPF.

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