**Polymeric smart coatings containing modified capped Halloysite nanotubes for corrosion protection of carbon steel**

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**Tensile testing of unmodified and modified coatings**

The polar nature of HNTs due to the outer silica-based surface and inner alumina-based surface enable them to be well dispersed in a polymer matrix such as epoxy. The high elasticity and strength of HNTs make them appropriate reinforcement into an epoxy matrix which also enhances the tensile strength of epoxy [1]. The tensile strength measured using a Universal testing machine demonstrated that modified epoxy coatings possessed more strength than blank epoxy coating. The thickness of each coating was 0.840 mm at tensile testing. The tensile strength of the blank epoxy coating is recorded as 6.03 MPa and that of modified smart coatings as 15.28 MPa with the stiffness of 787.07 and 472.01 N/m, respectively. The noticeable increase in the tensile strength of the modified coatings can be associated with (i) Dispersion hardening impact due to the presence of HNTs, (ii) increase in the load-bearing properties due to the development of composite structure, (iii) increased dislocation densities (iv) well dispersion of HNTs in the epoxy matrix which causes crystallization of epoxy monomer and (v) tubular interfacial interactions. The improved mechanical strength is also attributed to the good compatibility of HNTs with epoxy matrix, which provides better adhesion of coatings with steel substrate due to the tubular interaction of HNTs with epoxy [1–3].

**References**

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