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Comprehensive Microstructural and Thermal Analysis of Nano Intumescent Fire Retardant Coating for Structural Applications

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Abstract : Intumescent fire retardant coating (IFRC) is applied on the surface of material requiring fire protection. In this research work, IFRC's were developed using ammonium polyphosphate, expandable graphite, melamine, boric acid, zinc borate, mica, magnesium oxide, and bisphenol A BE-188 with polyamide polyamine H-4014 as curing agent. Formulations were prepared using nano size MgO and compared with control formulation i.e. without nano size MgO. Small scale hydrocarbon fire test was conducted to scrutinize the thermal performance of the coating. Char and coating were further characterized by using FESEM, FTIR, EDS, TGA and DTGA. Thus, Intumescent coatings reinforced with 2 wt. % of nano-MgO (rod shaped particles) provide superior thermal performance and uniform microstructure of char due to well dispersion of nano particles.

Keywords : intumescent coating, char, SEM, TGA
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