

Expanded Polystyrene Coated with Halogen Free Flame Retardant Material to Achieve Fire Safety Norms

Bhoite sangram, 홍창국^{1,†}

Chonnam National University; ¹전남대학교

(hongck@chonnam.ac.kr[†])

The compatibility and coating ratio between flame retardant materials and expanded polystyrene (EPS) foam is a major impediment to achieving satisfactory flame retardant performance. In this study, we prepared a water based intumescent flame retardant(IFR) system and methylene diphenyl diisocyanate (MDI)-coated expandable polystyrene microspheres by a simple coating approach. We investigated the compatibility, coating ratio, and fire performance of EPS and MDI-coated EPS foam using a water based IFR system. The microscopic study revealed that the water based IFR materials were successfully incorporated with and without MDI-coated EPS microspheres. The cone calorimeter tests (CCT) of the MDI-coated EPS containing water based IFR materials exhibited better flame retardant performance with a lower total heat release (THR) 7.3 MJ/m², peak heat release rate (PHRR) 57.6 kW/m², fire growth rate (FIGRA) 2027.067 W/m².s, and total smoke production (TSP) 0.133 m². Our results demonstrated that the MDI-coated EPS containing water based IFR materials achieved flame retarding properties as per fire safety standards.