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Effect of Flame Retardant Fillers on Fire Protection Performance and Mechanical Properties of Intumescent Coating

M.C. Yewa,*, N.H. Ramli Sulonga, M.K. Yewa, M.A. Amalinab and M.R. Johanb

In the present work, the effect of inorganic flame retardant fillers on the fire protection performance and mechanical properties of intumescent coatings have been synthesized and characterized by Bunsen burner, thermogravimetric analysis, field emission scanning electron microscopy, static immersion test and pull-off type equipment. The combination of aluminium hydroxide (Al(OH)3) filler and titanium dioxide (TiO2) pigment added to the flame retardant additives and acrylic binder led to the excellent performance in terms of fire protection, sticking ability, thermal stability and water resistance. The adhesion strength results showed that the coating filled by individual Mg(OH)2 filler exhibited maximum bonding strength to the metal surface due to its effective interface adhesion. Hence, the findings of this study are of primary importance as they reveal that the selection of appropriate flame retardant ingredients strongly influenced the physical and chemical properties of intumescent coating.

Keywords: Acrylic resin; Intumescent coating; Flame retardant additives; Steel

M.C. Yewa,*, N.H. Ramli Sulonga, M.K. Yewa, M.A. Amalinab, M.R. Johanb
a Department of Civil Engineering, Faculty of Engineering, University of Malaya, Lembah Pantai, 50603 Kuala Lumpur, Malaysia
b Centre of Advanced Materials, Department of Mechanical Engineering, Faculty of Engineering, University of Malaya, Lembah Pantai, 50603 Kuala Lumpur, Malaysia
*Corresponding author:
EMAIL-mail address: yewmingchian@siswa.um.edu.my, yewmingchian@gmail.com