

Simple preparation of iron oxide/heptazene core-shell material for the halogen-free flame retardant application

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Flame retardants(FRs) can be classified into halogen-based and halogen-free FRs. Halogen-based FRs are highly efficient and commonly used. Recently, halogen-based FRs have been banned due to the formation of the toxic gases and smoke. To avoid the toxic gas formation during the combustion, nitrogen-containing FRs have been developed. Two-dimensional carbon nitride has been applied as a flame retardant due to its thermal stability, non-flammable gas releasing property. Nevertheless, carbon nitride is too stable to release enough non-flammable gases. To prepare more efficient FR, we prepared iron oxide/heptazene core-shell material. Iron oxide may act as a catalyst of the char layer formation. In addition, iron oxide itself can improve the thermal stability of the composite. In this work, iron oxide/heptazene core-shell material was synthesized by the facile ball milling method and the heat treatment at 360 °C. The synthesized filler was characterized by SEM, XRD analysis to optimize the melamine to iron oxide ratio. This work was supported by the Technology Innovation Program(20009983) funded by the Ministry of Trade, Industry and Energy (MOTIE, Korea).