

Fire Characteristic of Commercial Retardant Flame Polycarbonate under Different Oxygen Concentration: Ignition Time and Heat Blockage

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Abstract : The commercial retardant flame polycarbonate samples as the main high speed train interior carriage material with different thicknesses were investigated in Fire Propagation Apparatus with different external heat fluxes under different oxygen concentration from 12% to 40% to study the fire characteristics and quantitatively analyze the ignition time, mass loss rate and heat blockage. The additives of commercial retardant flame polycarbonate were intumescent and maintained a steady height before ignition when heated. The results showed the transformed ignition time $(1/t_{ig})^n$ increased linearly with external flux under different oxygen concentration after deducting the heat blockage due to pyrolysis products, the mass loss rate was taken on linearly with external heat fluxes and the slope of the fitting line for mass loss rate and external heat fluxes decreased with the enhanced oxygen concentration and the heat blockage independent on external heat fluxes rose with oxygen concentration increasing. The inquired data as the input of the fire simulation model was the most important to be used to evaluate the fire risk of commercial retardant flame polycarbonate.

Keywords : ignition time, mass loss rate, heat blockage, fire characteristic

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