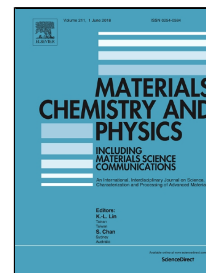


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Abstract: A novel polymeric flame retardant poly(pentaerythritol phosphate phosphinic acyl piperazine) (PPAP) was synthesized successfully. The structure was confirmed by Fourier transform infrared spectra (FT-IR) and nuclear magnetic resonance spectra (NMR). The flame retardant property was characterized by limited oxygen index (LOI) and cone calorimetry test. Compared with 19% of epoxy resin, the LOI value of epoxy resin/PPAP composites (EP/PPAP) could reach high up to 35% when PPAP content was 20wt % (EP-4) and the photographs of char residues demonstrated excellent char-forming ability of PPAP. The increasing char residues in thermogravimetric analysis (TGA) and analyses of real time FT-IR (RT-FTIR) showed improved thermal stabilities of EP/PPAP composites. The formation of enhanced stable char layer were proved by FT-IR, scanning electron microscopy (SEM) and Raman spectroscopy. The dynamic mechanical properties of EP/PPAP composites such as storage modulus and crosslinking density were substantially

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