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ABSTRACT: With growingly demands for better performances in electronic-related applications, further improving thermal and fire safety of nylon 612 (PA612) becomes extremely pressing. In this work, we have reported the fabrication of flame retardant and thermally stable and conductive PA612 composites by using two-dimensional alumina platelets. Alumina platelets are observed being uniformly dispersed within the PA612 matrix. Thermal analysis demonstrates that addition of alumina platelets noticeably increases thermal stability and conductivity of PA612. Cone calorimetry results show that 40 wt% of alumina platelets addition decreases the peak heat release rate (pHRR) and total smoke production of PA612 by 54% and 29%, respectively, indicating largely enhanced flame resistance. Rheology tests demonstrate that there exists a nearly qualitative correlation between the flammability (pHRR) and viscoelastic behaviours (storage modulus). This work offers a new approach for creating advanced polymer composites with enhanced thermal and flame retardancy properties by using alumina platelets as multifunctional filler.

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