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ABSTRACT

The interfacial interaction in polyamide/tin-fluoro-phosphate glass (TFP-glass) composites exhibits a positive correlation with temperature, whose mechanism is still unknown. The thermal-induced dissociation behavior at 232℃ of TFP-glass, which has been observed and investigated in our previous works, provides a plausible mechanism for the temperature-dependency of the interfacial interaction. In this work, the influence of the dissociation degree, which is controlled by processing temperature, on the interfacial interaction between TFP-glass and copolymerized 6/66 copolymer (cPA) is investigated. Three processing temperatures, 215, 230, and 245℃ (below, around and above the dissociation temperature of TFP-glass, T_d = 232℃), are chosen to prepare cPA/TFP-glass composites. With increasing the degree of dissociation, improved dispersion of TFP-glass particles in polymer matrix and enhanced interconnection between the two components are observed, indicating that the interfacial interaction in cPA/TFP-glass composites is gradually enhanced. The dielectric relaxation spectra, which can probe the local motions of macromolecular fragments at different length scales, are used to investigate the influence of the dissociation degree on the length scale of the interfacial interaction in cPA/TFP-glass composites. The improved thermal stability of cPA/TFP-glass composites filled with the same content of TFP-glass also confirms the enhancement of the interfacial interaction. Therefore, conclusions can be drawn that the dissociation behavior of TFP-glass is contributed to the temperature-dependency of the interfacial interaction in polyamide/ TFP-

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