



**Tailoring the structure of aligned carbon nanotube bundle by reactive polymer for strengthening its surface interaction with thermosets and the excellent properties of the hybrid thermosets**

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ABSTRACT: Aligned carbon nanotube bundles (ACNTB) with multi-level hierarchical structures were tailored by reactive polymer vinyl-terminated polyphenylene ether (PPE) for the excellent integrated property of bismaleimide-triazine (BT) resin. The PPE-tailored ACNTB (ACNTB@PPE) has increased strength for the penetration of PPE into porous ACNTB strengthening the interaction between each CNT. The strong interaction at the interface of ACNTB@PPE and BT matrix can be created owing to the reaction of the vinyl group in PPE on the surface of ACNTB and maleimide group in BT. BT with 2% ACNTB@PPE composite shows the optimal flexural strength, fracture toughness and tensile strength, which are 88%, 115% and 77% higher than those of BT, respectively. The introduction of ACNTB@PPE slightly enhances the thermal property of BT. ACNTB@PPE can significantly improve the flame retardancy of BT composites. As compared to individual ACNTB, ACNTB@PPE effectively improves the integrated property of

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