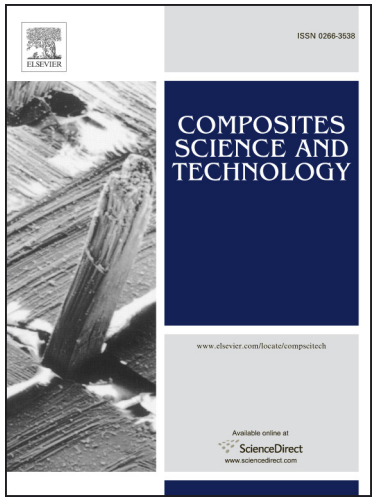


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# The role of crystallinity in SWCNT-polyetherimide nanocomposites

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**ABSTRACT**. Two all-aromatic, high-performance poly(etherimide)s ODPA-P3 (**I**) and BPDA-P3 (**II**) are studied as a function of SWCNT loading. Polyetherimide **I** is amorphous but SWCNTs nucleate crystallization during imidization to produce a nanocomposite (nc-**I**) with SWCNTs embedded in the crystals. This crystalline interphase, with a radial thickness of ~8 nm, results in a substantial reinforcement efficacy. Melting the interphase and cooling nc-**I** yields an amorphous nanocomposite with an interphase thickness (3.6 nm) that is smaller and has a lower reinforcement efficacy. Polyetherimide **II** was used as a reference since SWCNTs reside in the amorphous fraction of its nanocomposite. Consequently, the reinforcement efficiency of the semi-crystalline nc-**II** and its amorphous analog (prepared by heating above the crystal melting point and cooling) remains unchanged. A crystalline interphase surrounding SWCNT-reinforced