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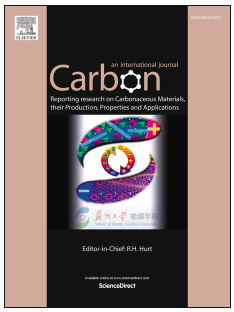

Facile preparation of lightweight high-strength biodegradable polymer/multi-walled carbon nanotubes nanocomposite foams for electromagnetic interference shielding

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Facile Preparation of Lightweight High-strength Biodegradable Polymer/Multi-Walled Carbon Nanotubes Nanocomposite Foams for Electromagnetic Interference Shielding

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Abstract

Lightweight conductive polymer composites (CPCs) have been considered as the most promising alternatives to metal-based shields for electromagnetic interference (EMI) shielding application but still face non-degradation issues. We report a facile, inexpensive and green method to implement lightweight biodegradable poly (L-lactic acid) (PLLA)-multiwalled carbon nanotubes (MWCNTs) nanocomposite foams using a combinatorial technology of pressure-induced flow (PIF) processing and supercritical carbon dioxide (Sc-CO_2) foaming. Such low-density (~0.3 g/cm^3), low thickness (~2.5 mm), high compressive strength (~54 MPa·g^{-1}·cm^3)) and highly conductive (~3.4 S·m^{-1}) PLLA-MWCNT nanocomposite foams were first reported as an EMI shielding material: it presents high performance EMI shielding with a remarkable effectiveness and a corresponding average specific EMI SE of ~23 dB and ~77 dB·g^{-1}·cm^3, respectively, with less reflection in the measured X-band frequency region. Considering the simple,