

# Accepted Manuscript

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PII: S0008-6223(16)30323-2

DOI: [10.1016/j.carbon.2016.04.052](https://doi.org/10.1016/j.carbon.2016.04.052)

Reference: CARBON 10933

To appear in: *Carbon*

Received Date: 22 February 2016

Revised Date: 12 April 2016

Accepted Date: 22 April 2016

Please cite this article as: T. Kuang, L. Chang, F. Chen, Y. Sheng, D. Fu, X. Peng, Facile preparation of lightweight high-strength biodegradable polymer/multi-walled carbon nanotubes nanocomposite foams for electromagnetic interference shielding, *Carbon* (2016), doi: 10.1016/j.carbon.2016.04.052.

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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<sub>2</sub>) foaming. Such low-density (~0.3 g/cm<sup>3</sup>), low thickness (~2.5 mm), high compressive strength (~54 MPa·g<sup>-1</sup>·cm<sup>3</sup>) and highly conductive (~3.4 S·m<sup>-1</sup>) 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<sup>-1</sup>·cm<sup>3</sup>, respectively, with less reflection in the measured X-band frequency region. Considering the simple,

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