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Research on High Electromagnetic Interference Shielding Effectiveness of a Foldable Buckypaper/Polyacrylonitrile Composite Film via Interface Reinforcing

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Abstract

Herein, a series of foldable buckypaper/polyacrylonitrile (BP/PAN) composite films were developed in a facile strategy. This strategy was based on electrospun and vacuum pressurized filtration methods. The composite film had better mechanical properties than pristine BP via interface reinforcing, but not deprived of excellent conductivity. The maximum tensile strength and elongation at break of BP/PAN films were 1.45 and 11.65 times than pristine BP, respectively. Moreover, BP/PAN film had higher electromagnetic interference (EMI) shielding effectiveness (63.7-65 dB) in the Ku band (12-18 GHz) than pristine BP (34.3-42.9 dB), due to interfaces forming between PAN fibers and CNTs. The BP/PAN composite as a promising EMI shielding material could be utilized in military and civil applications, such as flexible antenna, EMI shielding clothes and soft portable electronic products.

Key words: Buckypaper; Polymer-matrix composites; Electromagnetic interference shielding.

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