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Abstract:

Understanding the effect of thermal-air ageing treatment as well as concentration and dispersion of multiwall carbon nanotubes (MWCNT) in chlorinated polyethylene (CPE) system is very crucial for the development of a broad array of technological applications. This present work demonstrates an ultra-sonication assisted solution mixing strategy followed by hot compression for proper distribution of up to 15 wt% MWCNT within CPE matrix. Proper distribution of MWCNTs leads low percolation threshold (~ 2.97 wt%) with high electrical conductivity value of 0.0035 S/cm and electromagnetic interference (EMI) shielding efficiency (36 dB) for 15 wt% MWCNT loading in the X-band frequency region (8.2-12.4 GHz). EMI shielding efficiency is discussed based on the nanofiller loading, thickness of material, after thermal-air ageing treatment, and repeated bending test. On account of thorough investigation, the proposed composites explore its emerging potential for making flexible and light weight EMI shields in vast areas from academic to industrial applications.

Keywords: Nanocomposites; Carbon nanotube; Electromagnetic interference shielding; Electrical conductivity; Mechanical properties.