

Single-stage plasma-chemical synthesis and characterization of carbon nanoparticle-polymer suspensions

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Abstract

© 2020 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim A thin-film styrene polymer-carbon nanoparticle composite was obtained in a single-stage alternating current dielectric barrier discharge plasma-chemical process. The allotropic forms of the carbon nanoparticle filler were traced by transmission electron microscopy (TEM). TEM revealed an extraordinary adhesive encapsulation of the carbon nanoparticles by the polymer. It was found that the corona discharge regime provides an onion-like carbon filler that enhances the mechanical strength and chemical resistance of the synthesized polymer-carbon nanoparticle film. Measurements of the electrical properties of the films implicitly confirmed the uniformity of the carbon filler distribution.

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Keywords

AC barrier discharges, adhesion, encapsulation, plasma-chemical synthesis, polymer-carbon composite

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