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Action of colloidal silica films on different nano-composites

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Results in Physics

Volume: 6 Pages: 209-214
 DOI: 10.1016/j.rinp.2016.04.014
 Published: 2016

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Abstract

Nano-composite films have been the subject of extensive work to develop the energy-storage efficiency of electrostatic capacitors. Factors such as polymer purity, nano-particles size, and film morphology drastically affect the electrostatic efficiency of the dielectric material that form an insulating film between conductive electrodes of a capacitor. This in turn affects the energy storage performance of the capacitor. In the present work, we have studied the dielectric properties of 4 high pure amorphous polymer films: polymethylmethacrylate (PMMA), polystyrene, polyimide and poly-4-vinylpyridine. Comparison between the dielectric properties of these polymers has revealed that the higher break down performance is a character of polyimide PI and PMMA. Also, our experimental data shows that adding colloidal silica to PMMA and PI leads to a net decrease in the dielectric properties compared to the pure polymer. (C) 2016 The Authors. Published by Elsevier B.V.

Keywords

Author Keywords: Dielectric break down; Polymers; Nano-composite; Colloidal silica
KeyWords Plus: DIELECTRIC-BREAKDOWN PERFORMANCE; NANOCOMPOSITE FILMS; ENERGY-STORAGE; POLYMER COMPOSITES; FABRICATION; MORPHOLOGY; PARTICLES

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Publisher

ELSEVIER SCIENCE BV, PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS

Categories / Classification

Research Areas: Materials Science; Physics
Web of Science Categories: Materials Science, Multidisciplinary; Physics, Multidisciplinary

Document Information

Document Type: Article
Language: English
Accession Number: WOS:000389770300052
ISSN: 2211-3797

Journal Information

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