Special Issue

Polymer Dielectrics: Crystalline Materials as Energy Storage Systems

Message from the Guest Editors

Most polymers are dielectrics and thus are employed as electrical insulators to protect conducting cables from environmental damage and guarantee safe use. When an electric field is applied to a dielectric material, capacitive electrical energy can be stored due to polarization effects, a phenomenon that can be used in rechargeable energy storage devices. The storage properties can be tailored by adding high permittivity nano-inclusions. The crystallinity and crystal morphology affect the dielectric properties by enhancing interfacial polarization phenomena and increase the dielectric breakdown strength due to a higher resistance to electrical treeing. The observed increase in breakdown strength is correlated with crystal orientation, because the crystallites provide higher barriers against electical failure. For example biaxial orientation of semi-crystalline polymers, like polypropylene, has found use in thin dielectric films for capacitors in electrical energy storage power applications.

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Message from the Editor-in-Chief

Welcome to *Crystals*, the journal dedicated to the fascinating world of crystallographic research! Crystals are more than mere decorative elements; they hold the key to understanding the fundamental structure of matter. Our mission is to explore the crucial significance of this research across various fields. From medicine to technology, chemistry to geology, crystals play a vital role. Their structure provides insights into new advanced materials, innovative drugs, and groundbreaking technologies. Through *Crystals*, we delve into the microscopic world to discover solutions that will shape the future. Join us on a journey through the *Crystals*, where science merges with beauty and innovation.

Editor-in-Chief

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