Special Issue

Structure-Property Relationship in Oriented Polymer Nanocomposites

Message from the Guest Editors

Nanocomposite polymers have garnered considerable attention in recent years due to their diverse applications in everyday products and various industrial sectors. A key requirement for their optimized design is a deep understanding of structure–property relationships. Despite significant scientific and technological progress, major challenges remain in improving their mechanical, electrical, and thermal performance. These include nanoparticle dispersion and distribution, matrix–particle interfacial interactions, uncertainties in percolation network formation, and the comprehensive characterization of internal structures. Moreover, most processing methods (e.g., injection molding, extrusion, melt spinning, 3D printing) induce anisotropy in both the crystalline structure of the polymer matrix and the distribution of nanoparticles. This anisotropy introduces further challenges such as orientation control and quantification, interfacial anisotropy, coupled anisotropic properties, multiscale modeling difficulties, and limitations in anisotropy characterization—all of which are critical for linking processing conditions to anisotropic mechanical, electrical, and thermal properties.

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Since its foundation in 2009, *Polymers* has developed into an internationally renowned, extremely successful open access journal. The editorial team and the editorial board dedicatedly combine open-access publishing and high-quality rigorous peer reviewing. The performance of the journal has proven this strategy to be well-suited and highly successful. This is reflected in the increasing impact factor of *Polymers*, the most recent one being 4.9.

I would like to invite you to contribute to the success of the journal by sending us your high quality research papers. We would be pleased to welcome you as one of our authors.

Editor-in-Chief

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