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Special Issue Reprint

Advances and Applications of Block Copolymers II

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This Reprint focuses on polymeric materials, specifically copolymers, and their various applications. Research on polymers has significantly increased in recent years, yielding new insights into how they can enhance existing technologies and systems. Currently, researchers have access to a variety of polymerization techniques that are capable of polymerizing most monomers, thus creating block copolymers (BCPs) with advanced properties, such as self-healing, self-assembly, high biocompatibility, and responsiveness. Numerous studies have been published on the potential applications and benefits of BCPs, demonstrating their substantial scientific, societal, and economic impacts. However, several challenges remain in their development and utilization, including issues related to synthetic procedures, scalability, the use of biocompatible materials, and advanced high-tech applications. This Reprint addresses these challenges, as well as various synthetic approaches to producing copolymers, and explores a range of topics in polymer science, including molecular and morphological characterization, crystallinity, self-assembly, renewable copolymers, structure–property relationships, molecular dynamics, biomaterials, thermal properties, amphiphilic properties, scaling up production, reaction kinetics, CO₂ responsiveness, magnetic properties, nanomaterials, rheology, drug encapsulation, and chemical modification reactions.

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