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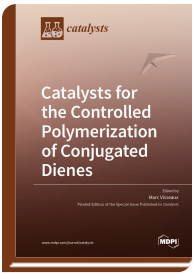
Special Issue Reprint

Catalysts for the Controlled Polymerization of Conjugated Dienes



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Since the beginning of the 1960s, the coordinative polymerization of conjugated dienes has continuously improved. Today, chemists know how to polymerize conjugated dienes stereospecifically and in a controlled fashion, both petro-sourced (nowadays also bio-sourced) and those of natural origin. The industry has greatly improved the performances of the catalytic systems—covering a wide range of elements including metals from groups 4–6 and 8–10, and rare earths—with the aim of optimizing the preparation of synthetic polymers for a large range of industrial applications. Nowadays, there is a better understanding of the polymerization mechanism involving allyl-active species, thanks in particular to the support of more efficient calculation methods. In addition, statistical copolymerization of 1,3-dienes with olefin or styrene comonomers and innovative approaches to coordinative chain transfer polymerization allow the production of copolymers with controlled topology, while a last challenge is about to be solved with the preparation of stereoregular polydienes that are also end-functionalized. This issue brings together several important aspects of this chemistry that remain at the forefront of both academic and industrial research.

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