

Nanostructured Functional Materials by ATRP

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ABSTRACT:

Many advanced nanostructured functional materials were recently designed and prepared by reversible deactivation radical polymerization (RDRP). Copper-based ATRP (atom transfer radical polymerization) catalytic systems with polydentate nitrogen ligands are among most efficient RDRP systems. Recently, by applying new initiating/catalytic systems, Cu level in ATRP was reduced to a few ppm. ATRP of acrylates, methacrylates, styrenes, acrylamides, acrylonitrile and other vinyl monomers was controlled by various external stimuli, including electrical current, light, mechanical forces and ultrasound, also in the presence of air. ATRP was employed for synthesis of polymers with precisely controlled molecular architecture with designed shape, composition and functionality. Block, graft, star, hyperbranched, gradient copolymers, molecular brushes, well-defined functional networks as well as various hybrid materials and bioconjugates were prepared with high precision. Special emphasis will be on nanostructured multifunctional hybrid materials for application related to biology, environment, and energy.

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