

## Well-Defined, Monovalent Organic Nanoparticles from Ring-Opening Metathesis Polymerization and Intramolecular Crosslinking

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Organic nanoparticles (ONPs), such as enzymes, proteins, and chromosomes, play essential roles in all life forms. As an ongoing effort to unmask the mysteries of nature, the usefulness of dendrimers and hyperbranched polymers as ONPs has been revealed in many cases of recent years. In our work, a new strategy for making organic nanoparticles from linear polymers was described. The monovalent particles were obtained by intramolecular crosslinking of the allyl-bearing, linear, monotelechelic polymers from ring-opening metathesis polymerization (ROMP). The synthesized particles had controllable molecular weight and narrow molecular weight distribution, and could undergo various functionalizations.

## Proton-Coupled Mechanochemical Transduction – Mechanogenerating Acids

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Acid catalyzed reactions can be used to promote the remodeling of a polymer backbone and/or side chains because the catalyst is simple, stable and can diffuse even in the solid state, allowing it to reach high turnover. Using known photochemically and thermally-promoted acid-producing reactions, unique mechanophores with acid-releasing capability were designed to produce a simple catalyst for chemical change in materials under mechanical stress. The development of these new mechanophores is a first step towards force-induced remodeling of stressed polymeric materials that will potentially enable the development of smart, autonomic self-healing polymers and composite materials.

