

Special Topic: Depolymerizable Polymers

Driven by the dual imperatives of global plastic pollution control and carbon neutrality, research on depolymerizable polymers has become a cutting-edge focus in polymer science. With the continuous emergence of innovative materials, strengthened policy support, and maturing industrial chains, these polymers are demonstrating transformative potential in critical sectors, such as environmental protection, healthcare, and industrial manufacturing, promising for reshaping the future landscape of the plastics industry.

We are honored to present the "Depolymerizable Polymers" special issue in the *Chinese Journal of Polymer Science* (CJPS), featuring 12 high-quality academic contributions (2 reviews and 10 research articles) that showcase the breakthroughs in this field and further contributions on this topic are forthcoming in CJPS—stay tuned for updates.

The review by Xuefeng Jiang *et al.* systematically evaluated cutting-edge advances in the depolymerization and functionalization of super-engineering plastics. Hai-Wang Lai and Makoto Ouchi summarized the most recent innovative progress in backbone degradable polymers prepared *via* chain-growth radical polymerization.

The research articles are categorized into following key themes:

(1) Synthetic Method Innovations: Min Chen, You-Gui Li and Muhammad Asadullah Khan *et al.*, developed a novel route based on ring-opening metathesis polymerization to prepare degradable imine-based polymers. Bin Wang and Xin-Cui Shi *et al.* used phenylimino-pyridine-phenolate zinc complexes for controlled synthesis of polylactide (PLA) under both mild and industrially relevant conditions, with a turnover frequency as high as 6200 h^{-1} . Yu-Zhong Wang's team developed an efficient homogenous hydrolysis method for PLA. This method is also compatible with

the highly selective recovery of PLA from various PLA products.

(2) New Material Development: Jin-Cai Wu and Hong-Zhang Cao *et al.* have synthesized high-molecular-weight thiosalicylic acid-based copolyesters with degradable and recyclable performance. Using microphase-separated interface crystallization, Yu-Zhong Wang and Gang Wu *et al.* created degradable poly(*p*-dioxanone)-based copolymers with enhanced mechanical properties. Additionally, Jun-Peng Zhao and Hong-Xin Zhang prepared the acid-degradable polyether and polyurethane *via* ring-closing-opening copolymerization of phthalaldehyde and epoxide. Jianbo Zhu's team prepared circular semi-aromatic polythioesters *via* a benzo-fusion strategy.

(3) Performance Enhancement: Xiao-Bing Lu and Ye Liu *et al.* introduced multiple chiral centers into aliphatic polyester backbones *via* asymmetric catalytic copolymerization to obtain highly crystalline materials. This study revealed an interesting method for regulating polymer crystallinity by matching the chirality of different monomers. Shan Tang *et al.* reported an interesting method that focused on engineering ester-containing degradable polyethylene through mechanochemical backbone editing. Xue-Si Chen and Xuan Pang *et al.* developed a versatile modified polyester platform using 4-bromophthalic anhydride, which demonstrated that the resulting brominated polyester exhibited remarkable functionalizability.

These studies provide rigorous theoretical insights and pioneering technological frameworks, while highlighting some of the most recent achievements in the area of depolymerizable polymers.

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