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Chemical aspects of polymer recycling

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摘要 Since recycling of polymers is a preferred means of reducing unwanted wastes and land-filling activity, and recovering monomers or other materials of economic value, tertiary methods of recycling (chemical recycling) have been critically reviewed, giving special attention, in each case, to the chemical basis of the particular recycling pathway and its potential applicability. Recycling issues of each of the widely used commodity polymers – polyesters, polyamides, polyurethanes, epoxies, poly(vinyl chloride), polystyrene, and polyolefins – have been discussed individually, giving attention to both conventional and unconventional methods of perceived high potential, such as enzymatic degradation, ionic liquids mediation, microwave irradiation, and treatment in super critical liquids as well as super fluids. In addition, novel emerging methods undergoing greater study at present, such as cross-alkane metathesis (CAM), tandem hydrogenolysis/aromatization, vitrimer-based recycling, and dynamic covalent bonding are also highlighted.

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