Faculty of Engineering
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Organocatalysts for Aerobic Oxidation Reactions

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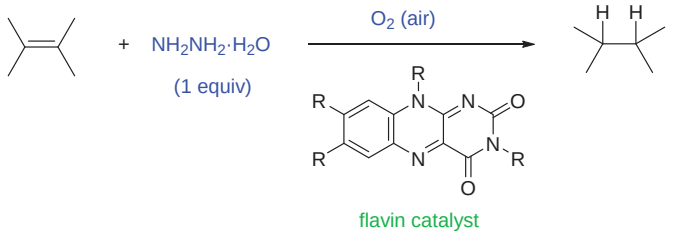

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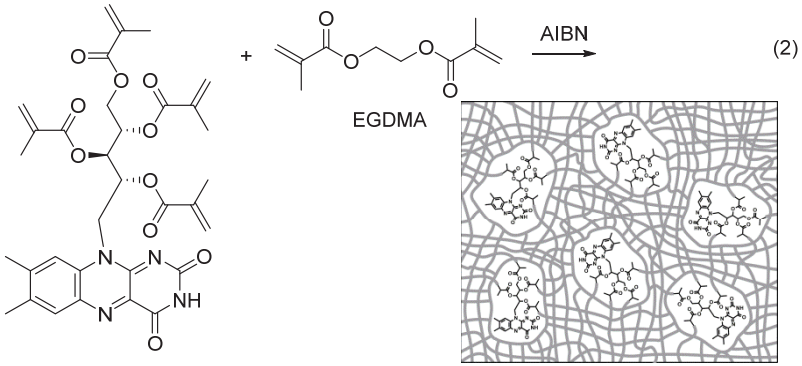

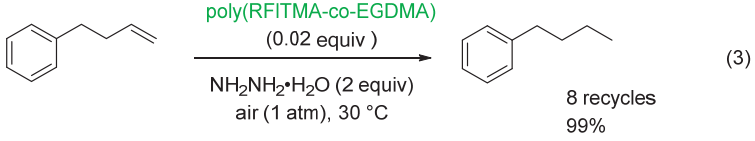

Content:

Organocatalysts have recently received considerable attention as a third group of catalyst in organic synthesis in addition to the conventional biocatalysts and metal catalysts. To meet the social demand to effectively and safely produce pharmaceuticals and functional materials on a large scale, it is highly desirable to design and develop organocatalysts with superior characteristics, including enhanced catalytic activities, handling ease, and stereochemical controllability.

We have been developed environmentally friendly aerobic molecular transformations using simple flavin molecules as organocatalysts. Foe example, olefins can be readily hydrogenated upon treatment with hydrazine hydrate and air in the presence of a catalytic amount of flavin molecules (Eq. 1). The reaction provides a highly environmentally benign and practical method for hydrogenation of olefins without using hydrogen gas and transition-metal catalysts.

To enhance the practicability of the flavin catalyst, we design and develop novel flavin-bound network polymer catalysts. Typically, poly(RFlTMA-*co*-EGDMA), prepared by the radical copolymerization of riboflavin tetramethacrylate with ethylene dimethacrylate (Eq. 2), can be used as a robust and recyclable catalyst (Eq. 3).

Keywords : organocatalyst, aerobic oxidation, polymer-supported catalyst

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