Asymmetric Michael and Aldol Reactions with a Supported Chiral Diamine

Significance: A magnetic nanoparticle supported chiral aminocyclohexane 1 was prepared according to eq. 1. Asymmetric Michael and aldol reactions were carried out in the presence of 1 and DMAP in water at room temperature (eqs. 2 and 3, respectively) to give the corresponding adducts in ≤94% yield and ≤100% ee.

Comment: The organocatalyst 1 was characterized by FT-IR, XRD, TEM, VSM, TG, and elemental analyses. In the reaction of nitrostyrene with isobutyraldehyde, the catalyst was magnetically recovered and reused four times without significant loss of its catalytic performance (fourth reuse: 83% yield, 95% ee).

Selected examples:

- 87% yield, 97% ee
- 91% yield, 99% ee
- 84% yield, 96% ee
- 86% yield, 99% ee

Selected examples:

- 85% yield, 96:4 anti/syn selectivity, 94% ee
- 89% yield, 99:1 anti/syn selectivity, 100% ee
- 81% yield, 94:6 anti/syn selectivity, 92% ee
- 80% yield, 95:5 anti/syn selectivity, 95% ee