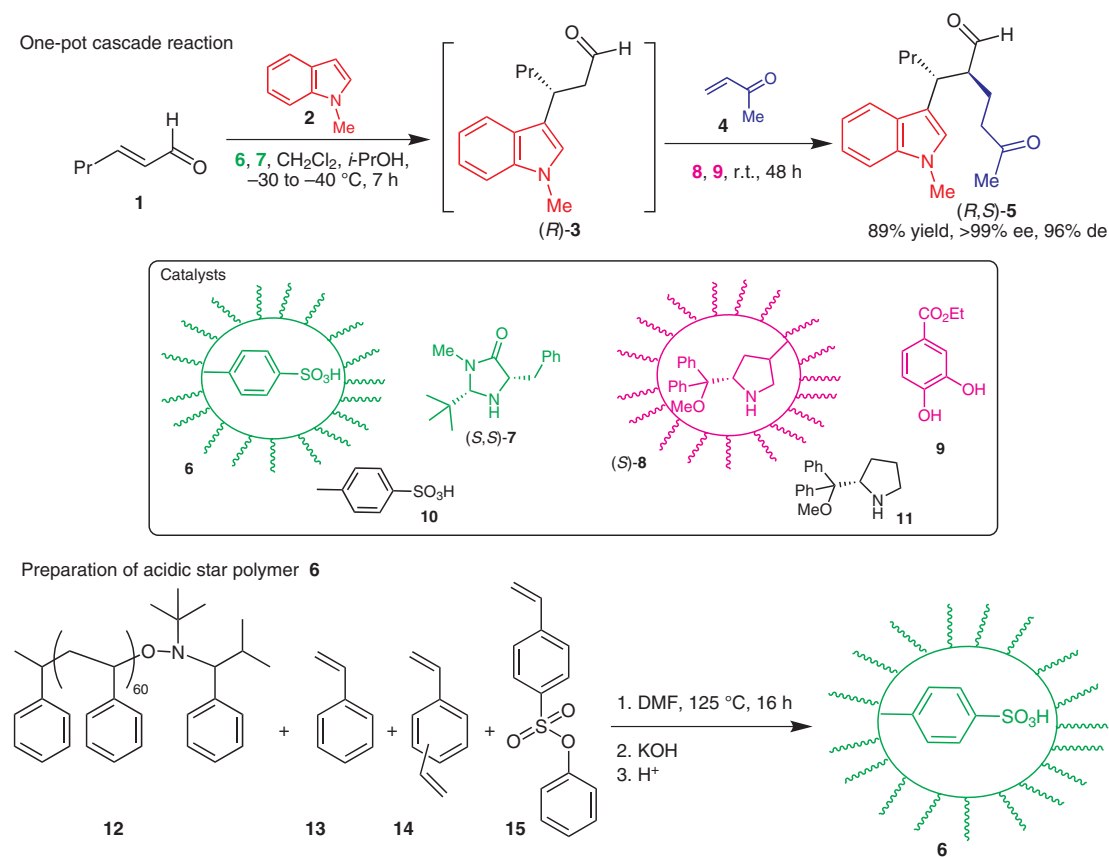


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One-Pot Multi-Component Asymmetric Cascade Reactions Catalyzed by Soluble Star Polymers with Highly Branched Non-Interpenetrating Catalytic Cores
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One-Pot Cascade Reactions Catalyzed by Star Polymer Catalysts



Significance: Non-interpenetrating two star polymer catalysts designed to mimic the site isolation characteristics of enzymes enabled a one-pot asymmetric cascade reaction. Thus, the one-pot nucleophilic addition of **2** to **1** and Michael addition of the resulting **3** to **4** were performed with a star polymer salt catalyst **6-7** (20 mol%) [prepared from an acidic star polymer **6** and imidazolidinone (S,S)-**7**], a pyrrolidine star polymer (S)-**8** (20 mol%), and a catechol mediator **9** (1 mol equiv) to give (R,S)-**5** in 89% yield with >99% ee and 96% de. The use of **10** or **11** in place of **6** or **8** under similar conditions did not give **5**.

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Comment: The acidic star polymer **6** was prepared from polystyrene macroinitiator **12**, styrene **13**, divinylbenzene **14** and phenyl *p*-styrene-sulfonate **15** according to their previous report (*Angew. Chem. Int. Ed.* **2005**, *44*, 6384). The amine star polymer **8** was prepared via a similar procedure. Polystyrene macroinitiator **12** was developed by Hawker and co-workers (*J. Am. Chem. Soc.* **1999**, *121*, 3904). When imidazolidinone (S,S)-**7** was replaced with its enantiomer (R,R)-**7**, a diastereomer (S,S)-**5** was obtained in 80% yield with >99% ee and 96% de.

Category

Polymer-Supported Synthesis

Key words

star polymer catalysts

cascade reaction

SYNFACT
of the month