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Enantioselective Dual-Catalysis: A Sequential Michael Addition/Asymmetric Transfer Hydrogenation of α-Nitrosulfone and Enones

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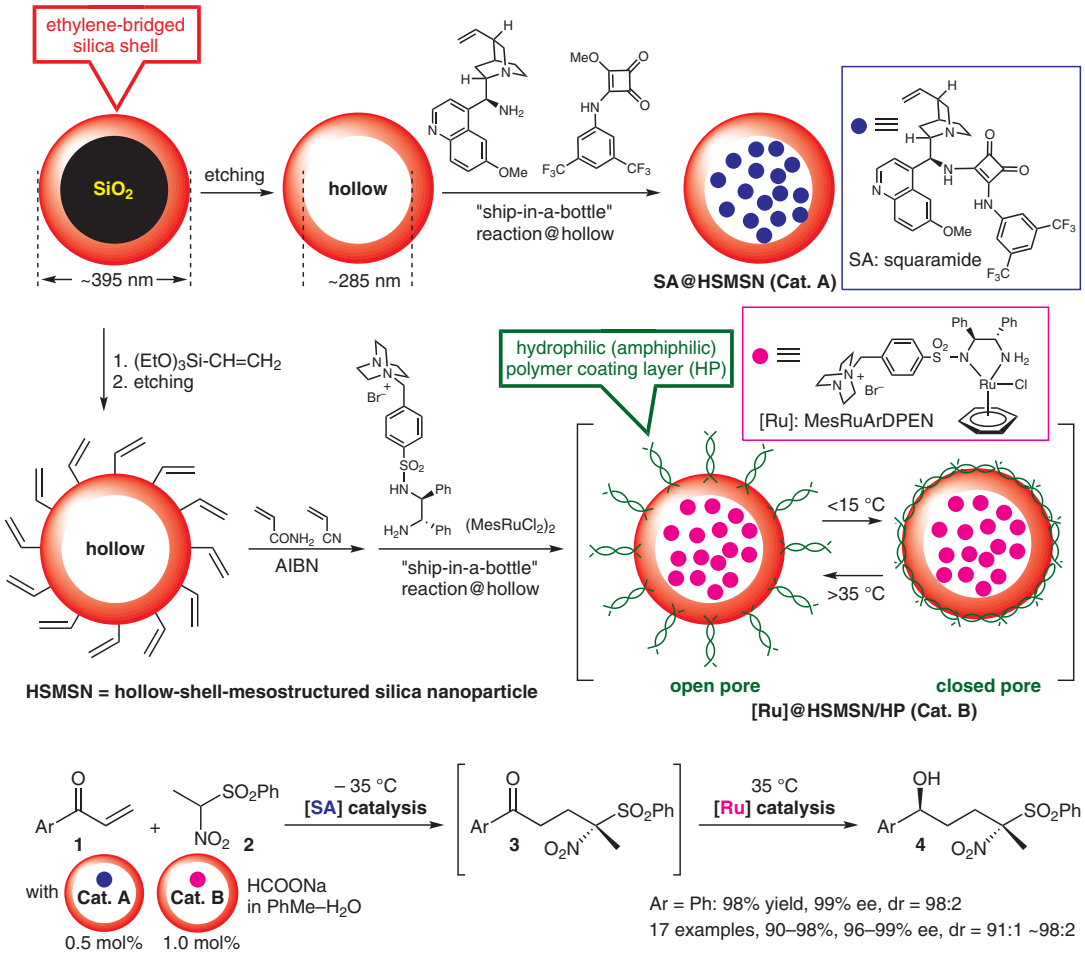
One-Pot Two-Step Catalytic Asymmetric Michael Addition/Hydrogenation



Significance: A one-pot two-step asymmetric Michael addition–transfer hydrogenation co-catalyzed by an immobilized organocatalyst [SA@HSMSN (**Cat. A**)] and a Ru complex catalyst [[Ru]@HSMSN/HP (**Cat. B**)] was developed. The reaction of enone **1** and nitro sulfone **2** in the presence of **Cat. A**, **Cat. B**, and HCO_2Na gave the corresponding alcohols **4** in excellent chemical yields and with high diastereoselectivity (96–99% ee).

Comment: Squaramide and MesRuArDPEN were immobilized in hollow-shell-mesostructured silica nanoparticles without or with a hydrophilic polymer coating to form **Cat. A** and **Cat. B**, respectively. **Cat. A** promoted the Michael addition at –35 °C, and **Cat. B** catalyzed the transfer hydrogenation at 35 °C, to realize temperature-dependent control of the sequential dual-catalytic process.

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Category

Polymer-Supported Synthesis

Key words

dual catalysis
one-pot synthesis
organocatalysis
ruthenium catalysis
asymmetric catalysis
Michael addition

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