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Styrene Hydroformylation with In Situ Hydrogen: Regioselectivity Control by Coupling with the Low-Temperature Water-Gas Shift Reaction

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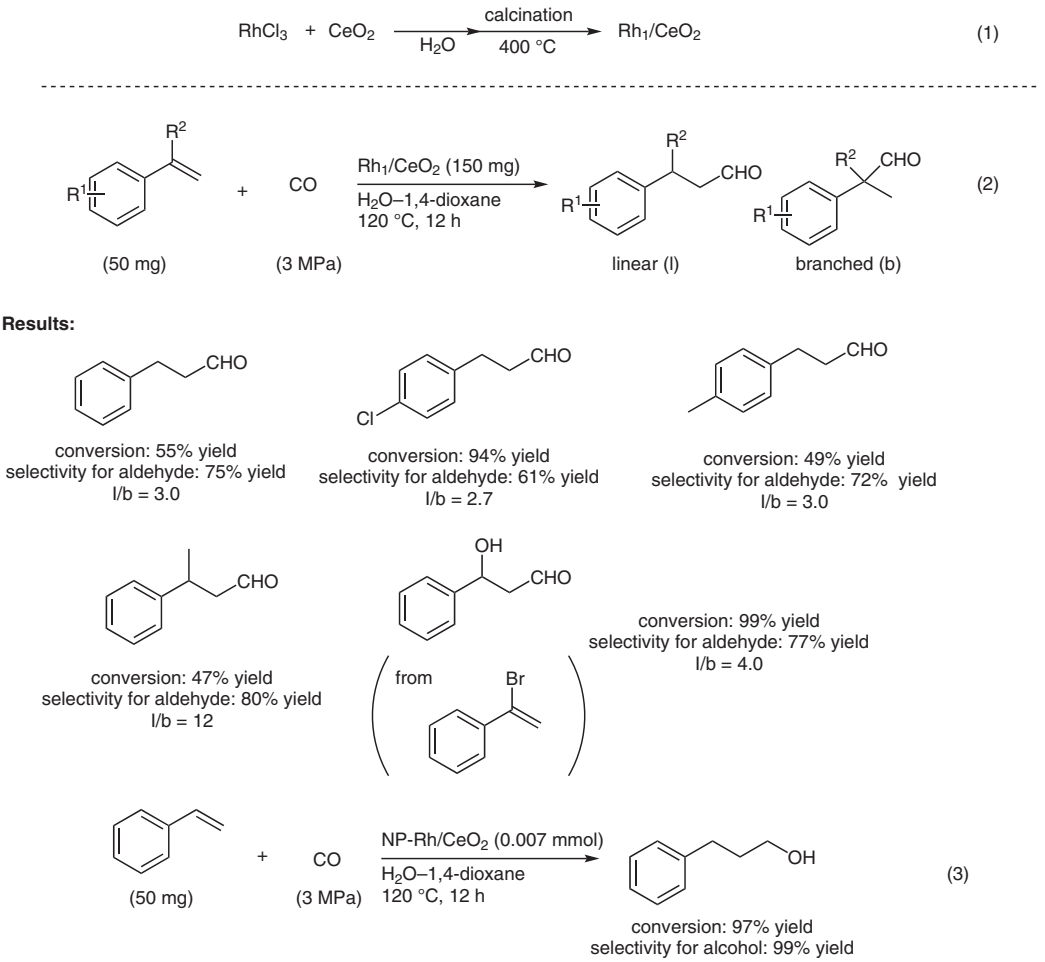
Hydroformylation of Styrene Derivatives Catalyzed by Rhodium Single-Atoms Supported on CeO_2



Significance: A rhodium single-atom catalyst on CeO_2 (Rh_1/CeO_2) was prepared by mixing $RhCl_3$ and CeO_2 in deionized water, followed by calcination at 400 °C (eq. 1). Rh_1/CeO_2 catalyzed the hydroformylation of styrene derivatives with hydrogen generated in situ from water and carbon monoxide to give the corresponding linear aldehydes in ≤ 99% conversion (eq. 2).

Comment: $Rh_1/CeO_2$was characterized by means of ICP-OES, STEM, HAADF-STEM, FT-IR, EDS analyses. In the hydroformylation of styrene, Rh nanoparticles supported on CeO_2 (NP-Rh/CeO_2) gave 3-phenylpropan-1-ol rather than 3-phenylpropanal, with 99% selectivity (eq. 3).

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Polymer-Supported Synthesis

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Synfact of the Month

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