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Original article

Selective conversion of furfural to cyclopentanol over cobalt catalysts in one step

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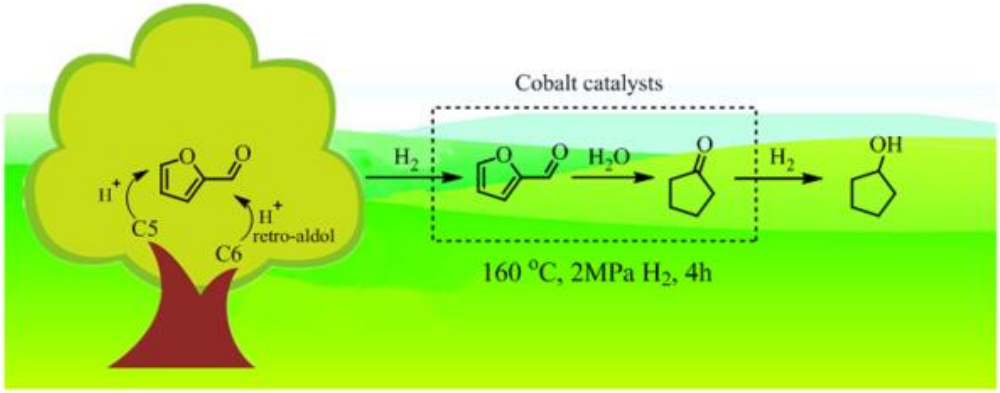
Graphical abstract



A series of cobalt catalysts with different supports were prepared for the selective conversion of biomass-derived furfural to cyclopentanol in one step. The best CPL yield was 82 mol% at 160 °C, 2 MPa H_2, 4 h when cobalt was supported on tetragonal zirconia that can be obtained by doping La_2O_3.

ABSTRACT A series of cobalt catalysts with different supports were prepared for the selective conversion of biomass-derived furfural to cyclopentanol (CPL) in one step. The best CPL yield was 82 mol% at 160 °C, 2 MPa H_2, 4 h when cobalt was supported on ZrO_2-La_2O_3. The supports were characterized by X-ray diffraction (XRD) and temperature-programmed desorption of ammonia (NH_3-TPD). The XRD results indicated that the more stable t-ZrO_2 formed by doping La_2O_3. The amount of acid sites of the catalyst increased, too. The influences of parameters such as reaction temperature, hydrogen pressure, and reaction time on the catalytic activity were also investigated. The polymer formed during the reaction may cause the deactivation of the Co/ZrO_2-La_2O_3 catalyst. This work provides a possibility to prepare the stable t-ZrO_2 and apply with cobalt metal for biomass valorization.

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