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Hydrogen-Induced Formation of Surface Acid Sites on Pt/Al(PO<sub>3</sub>)<sub>3</sub> Enables Remarkably Efficient Hydrogenolysis of C–O Bonds in Alcohols and Ethers

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# Hydrogenolysis of C–O Bonds in Alcohols, Carbonyls, and Ethers Using Pt NPs Supported on Al(PO<sub>3</sub>)<sub>3</sub>

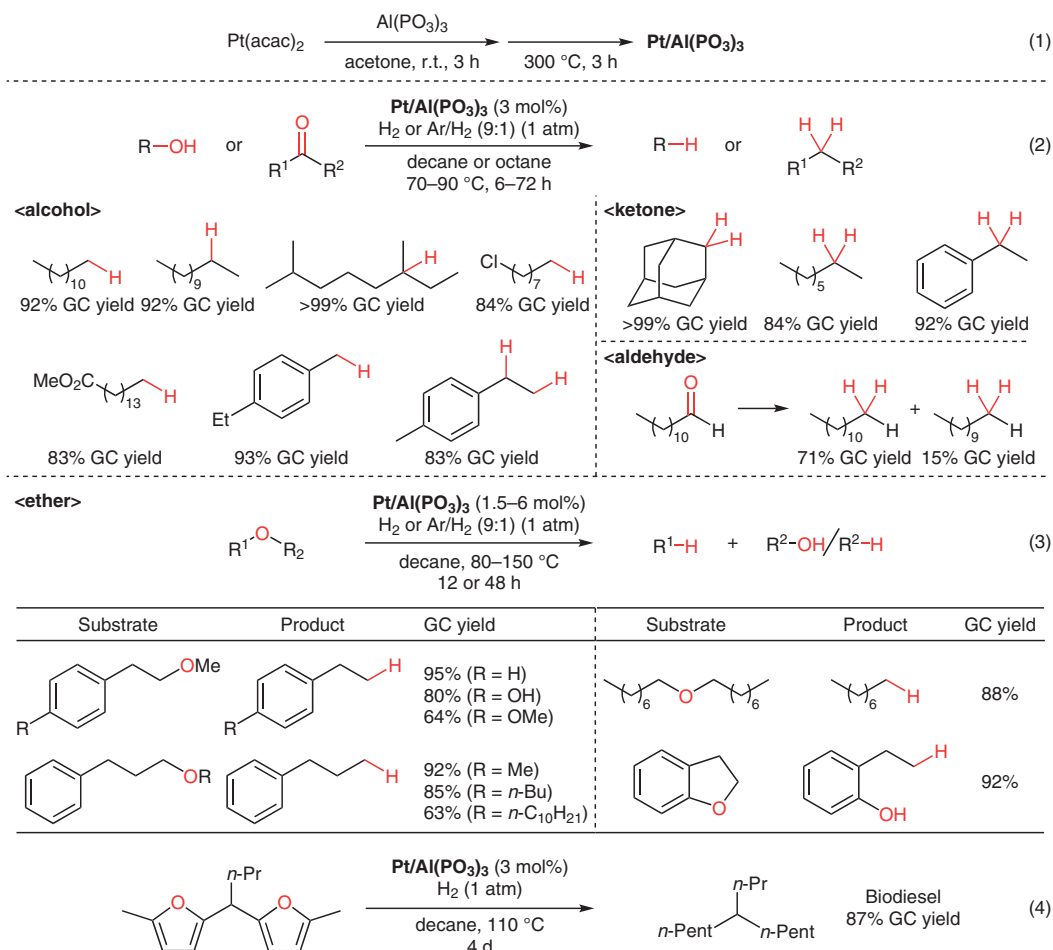
Category

Polymer-Supported Synthesis

Key words

platinum catalysis  
Brønsted acid  
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**Significance:** Platinum nanoparticles supported on Al(PO<sub>3</sub>)<sub>3</sub> (Pt/Al(PO<sub>3</sub>)<sub>3</sub>), prepared according to equation 1, catalyzed the hydrogenolysis of C–O bonds in alcohols and carbonyls under 1 atm H<sub>2</sub> or Ar/H<sub>2</sub> (9:1) atmosphere to afford the corresponding hydrocarbons in up to >99% yield (eq. 2). Pt/Al(PO<sub>3</sub>)<sub>3</sub> also promoted the hydrogenolysis of ethers under similar conditions to afford the corresponding hydrocarbons and alcohols in up to 95% yield (eq. 3).

**Comment:** The exhaustive hydrogenation of a biomass derived furanic compound took place at 110 °C with Pt/Al(PO<sub>3</sub>)<sub>3</sub> to give 6-propylundecane, a green fuel, in 87% GC yield (eq. 4). In the hydrogenolysis of 4-ethylbenzyl alcohol, the catalyst was recovered and reused four times without significant loss of its catalytic activity. Mechanistic studies suggested that Brønsted acid sites on the catalyst surface is essential to activate the C–O bond.

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