Water-tolerant SBA-16 confined phosphotungstic acid for controllable synthesis of jet fuel blending with cyclic ketones

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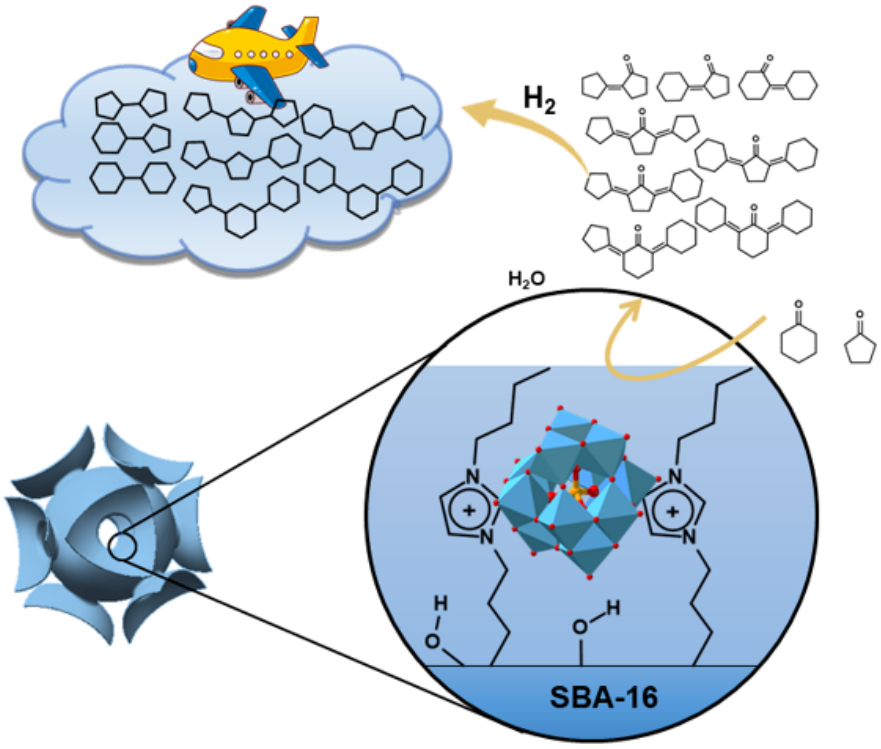
Abstract

Transferring lignocellulose-derived ketones to jet fuel blending through aldol condensation has great potential for the synthesis of high-performance jet fuels. However, the water formed in reaction decreases the activity of catalyst, especially the acid catalyst. Herein, water-tolerant SBA-16 confined phosphotungstic acid was developed to be applied in this reaction with high performance. The SBA-16-like pore size was regulated and the surface was modified by alkylimidazole which improves the water-tolerant property of catalyst by creating relative hydrophobic environment and leads to the resistance of HPW leaching and keeping stable performance of the catalyst in 5 runs of aldol condensation. About 64.2% primary-condensation products and 27.8% secondary-condensation products were produced by this catalyst. After hydrodeoxygenation, a high-performance fuel blending with density of about 0.905 g/mL and freezing point of -67 oC was obtained. This study provides a promising water-tolerant catalyst to develop a new route to produce high-performance bio-jet fuel blending.



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