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Enhanced Sorbose Selectivity from Glucose Isomerization on Lewis Acid Zeolites by Adjusting Confinement

A new Lewis acidic Ti-zeolite catalyst significantly enhances the selective formation of sorbose, improving the yield of precursors for high-value chemical and pharmaceutical products like vitamin C.

Current vitamin C synthesis pathways follow the Reichstein process composed of the reduction of glucose to sorbitol and the selective oxidation of sorbitol to sorbose over metalloenzyme catalysts. Sorbose can then be oxidized to form ascorbic acid, a direct precursor to vitamin C. Direct glucose-to-sorbose isomerization can be directly achieved over forms of Beta zeolites. Typical sorbose-to-fructose selectivities on Ti-Beta zeolites are 1.

Researchers at Purdue University have developed a method for highly selective sorbose formation. This new Lewis acidic Ti-zeolites have smaller micropore sizes than Ti-beta and result in more than in more than 10-30 times the enhancements in selectivities toward sorbose over competing isomer products such as fructose. This new technology can be used as a precursor for further conversion into other chemicals like vitamin C.

Advantages:

-Improves monosaccharide reaction selectivity to desired isomer and sorbose products

-Will lead to higher value pharmaceutical products

-Can be used as a precursor for vitamin C

Potential Applications:

-Chemical feedstock industry

-High value pharmaceutical products

TRL: 2

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