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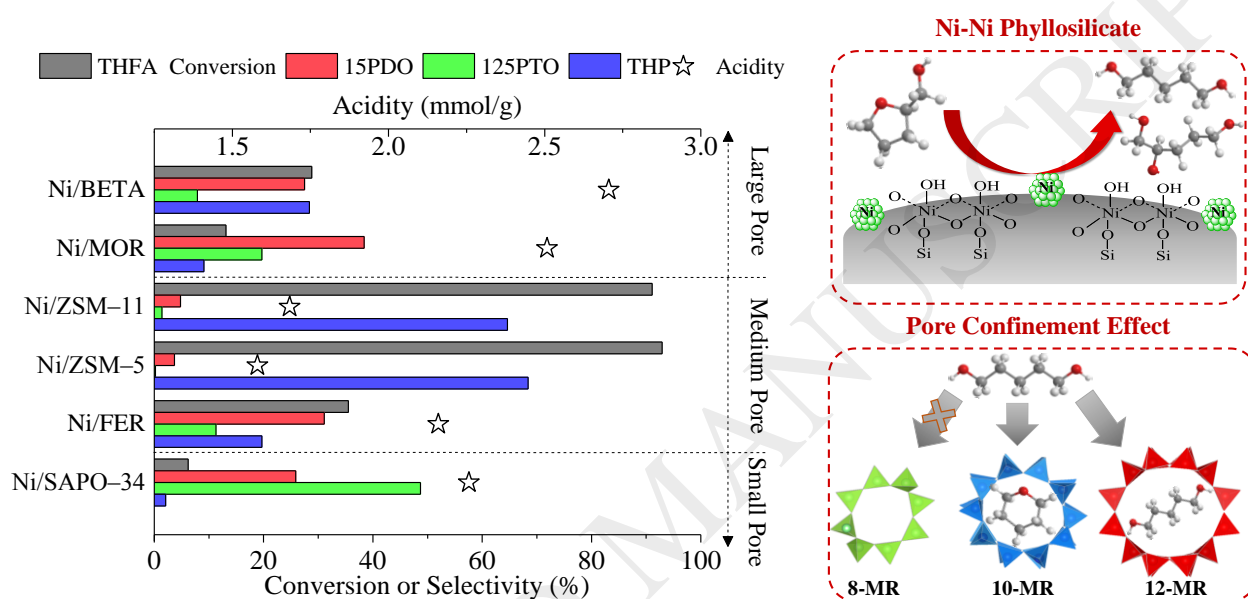
Zeolite-Supported Nickel Phyllosilicate Catalyst for C–O Hydrogenolysis of Cyclic Ethers and Polyols

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Graphical abstract:



Highlights:

- Zeolite-supported nickel nanoparticles have been prepared by deposition-precipitation method, forming Ni phyllosilicate precursor
- Medium-pore zeolites (ZSM-5 and ZSM-11) with mild acidity exhibited the highest reaction rate in the ring-opening of biomass-derived cyclic ethers and polyols
- Up to 38% 1,5-pentanediol selectivity is obtained at low conversion levels, while tetrahydropyran at a high yield of ca. 64% is the major product at high conversion levels
- ZSM-5 and ZSM-11 frameworks have pore confinement effect on the cyclo-dehydration of pentane polyols, enhancing the catalytic activity for the dehydration pathways
- Up to 51% selectivity towards 1,6-hexanediol is achieved during tetrahydropyran-2-methanol conversion over ZSM-5-supported nickel catalysts

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Abstract:

In this study, a series of zeolite structures, including small pore (SAPO-34), medium pore (Ferrierite, ZSM-5, and ZSM-11), and large pore (MOR and BETA) zeolites were explored as supports for nickel catalysts. The catalysts were prepared by the deposition-precipitation (D-P) method to obtain ca. 10 wt% Ni loading. The structures of prepared catalysts was elucidated using a wide range of

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