

Carbonylation of dimethyl ether to methyl acetate on the Zr-modified Ferrierite

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Dimethyl ether (DME) carbonylation for the synthesis of methyl acetate (MA), which can be further hydrogenated to form higher alcohols such as ethanol, was conducted using a home-made zirconium-modified H-form Ferrierite (Zr/FER) with the range of 0.2 - 0.8wt%Zr. The impregnated Zr on the FER at an optimal concentration enhanced the catalytic stability due to its selective adsorption on the strong acid sites of H-form FER, which seems to be responsible for a coke deposition and catalyst deactivation. However, catalytic activity on the Zr/FER was gradually decreased with the increase of zirconium content due to the possible blockage of micropores of the FER above 0.4wt%Zr. The maximum yield of MA was obtained on the 0.4wt%Zr/FER with a lower coke deposition, and the DME conversions showed a typical volcano pattern according to the Zr content on the H-form FER.