

### Carbonylation of Dimethyl ether to methyl acetate on various zeolites

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Ethanol is one of the effective alternative fuels to solve energy crisis, however, direct synthesis of ethanol from syngas has some disadvantages by forming a large quantity of byproducts and by showing a wide-range of alcohol distributions. Therefore, multistep ethanol synthesis from syngas has been recently proposed such as dimethyl ether(DME) carbonylation to methyl acetate(MA) and subsequent hydrogenation of MA to ethanol. Some researchers have recently reported that modernite zeolite is one of the active catalysts for DME carbonylation to MA at a high CO/DME molar ratio. In the present study, various zeolites such as modernite, ZSM5, Y and ferrierite were investigated at the reaction conditions of  $T = 250^{\circ}\text{C}$ ,  $P = 10$  bar and molar ratio of  $\text{CO/DME} = 9/1$ . The superior catalytic activity was found on ferrierite and its activity was further increased by modifying it with zirconium species. The different catalytic performances were also elucidated by analyzing the surface acidity and the desorption properties of reactants.