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Catalytic Deoxygenation of Propionic Acid in the Vapour Phase

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Abstract : The gas-phase deoxygenation of propionic acid was investigated in the presence of Co-Mo catalysts in N2 or H2 flow at 200-400 °C. In the presence of N2 the main product was 3-pentanone with other deoxygenates and some light gases: ethane and ethene. Using H2 flow, the catalyst was active for decarboxylation and decarbonylation of acid and the yields of ethane and ethene. The decarboxylation and decarbonylation reactions increased with increasing temperature. Cobalt-molybdenum supported on alumina showed better performance than bulk catalyst, especially at 400 °C in the presence of N2 for the ketonisation of propionic acid to form 3-pentanone as the main product. Bulk and supported catalysts were characterized by surface area porosity (BET), thermogravimetric analysis (TGA) and diffuse reflectance infrared Fourier transform spectroscopy (DRIFTS) of pyridine adsorption.

Keywords : deoxygenation, propionic acid, gas-phase, catalyst
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