



The effect of potassium addition on acidity of Y-zeolite catalysts

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The acidities of Y-zeolite catalyst have an influence on selectivity to acrylic acid for lactic acid dehydration reaction. The catalysts with high surface acidities can catalyze lactic acid dehydration to undesirable products such as acetaldehyde, propionic acid and 2,3-pentanedione. Y-zeolite catalysts modified with potassium were prepared by impregnation method at 1, 2 and 3 wt% of potassium nitrate. The effects of potassium on the structures and acidity of the Y-zeolite catalysts were investigated. The catalysts were calcined at 550 °C for 2 h in air atmosphere and characterized by using various methods, including X-ray diffraction (XRD), N₂ physisorption, ammonia temperature-programmed desorption (NH₃-TPD) and scanning electron microscope and energy dispersive X-ray spectroscopy (SEM-EDX). The results showed that the acidity and BET surface area of Y-zeolite catalysts modified with potassium decreased significantly with increasing potassium content from 1, 2 and 3 wt%, respectively. Neither potassium nor any unidentified phase was observed on the XRD patterns, indicating a good dispersion of potassium on Y-zeolite.

Keywords: Y-zeolite, potassium, acidity of catalyst, lactic acid dehydration