Catalytic Behavior of Ga Supported on Mesoporous TiO_2 Catalysts for The Dehydrogenation of Ethane to Ethylene

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Mesoporous titania (m-TiO_2) was synthesized by a facile hydrothermal method. The Ga supported on m-TiO_2 catalysts (Ga/m-TiO_2) were prepared by the *in situ* hydrothermal method and the impregnation method with a Ga loading varying in the range of 5-20 wt.%. The catalytic performance of Ga/m-TiO_2 catalysts was tested in the dehydrogenation of ethane (C_2H_6). The C_2H_6 conversion and the C_2H_4 selectivity drastically changed depending on the reaction temperature, the Ga loading and the catalyst preparation method. The conversion increased with raising the temperature up to 600 ºC. Among these catalysts, 10 wt.% Ga/m-TiO_2 exhibited the highest C_2H_6 conversion and C_2H_4 selectivity. The Ga/m-TiO_2 catalysts prepared by the *in situ* hydrothermal method showed better catalytic performance than Ga/m-TiO_2 catalysts prepared by the impregnation method. It can be due to the well dispersion of the small Ga species in the mesopores of m-TiO_2 during the hydrothermal treatment process. The Ga/m-TiO_2 catalysts possessed the superior conversion in compare to Ga supported on bulk TiO_2, which comes from the high surface area and high pore volume of m-TiO_2.