Oxidative Dehydrogenation of Ethylbenzene over Alkali metal Doped TiO_2-ZrO_2 using CO_2 as Soft Oxidant

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Ethylbenzene dehydrogenation with CO_2 as a soft oxidant has been studied intensively over different kinds of acid-base, redox and metal-free catalysts. CO_2 activation and utilization as soft oxidant for the oxidative dehydrogenation of ethylbenzene seem to require acid-base bifunctionality for the activation of both hydrocarbon and CO_2 , which was confirmed over TiO_2-ZrO_2 mixed metal oxide bifunctional catalyst, previously. Here, the alkali metals such as K and Na doped TiO_2-ZrO_2 were prepared by a caustic treatment method in order to enhance acid-base properties. These catalysts were proved to give remarkably high surface areas as well as the enhanced styrene yield of 60% with stability up to 10 hours of time on streams in the oxidative dehydrogenation of ethylbenzene at 600 °C.