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Carbon Nanotubes in Heterogeneous Catalysis

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Abstract

Carbon nanotubes have attracted lot of scientific interests nowadays world-wide. The fundamental research work is concentrated in two respects: the synthesis of carbon nanotubes in an economic way for large amount and the application of carbon nanotubes in technology, for instance as new field emitters or for hydrogen storages. Only few works are reported on the use of carbon nanotube as potential industrial catalysts. In the present work, we report on the first application of carbon nanotubes in the dehydrogenation of ethylbenzene to styrene at the temperatures between 450 and 550°C. For comparison, carbon black (Lamp soot of Degussa) and commercial graphite have also been tested as a catalyst for oxidative dehydrogenation of ethylbenzene at the experimental conditions. Our results reveal that carbon nanotubes show a higher activity, selectivity and yield relative to graphite and is highly active in the oxidative dehydrogenation of ethylbenzen to styrene, showing much higher performance than the anaerobic dehydrogenation. Our investigation opens a new application field of carbon nanotubes into the heterogenous catalysis.