

The Effect of Particle Size on CO Oxidation Activity over Co_3O_4 -supported Pd

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Palladium is well-known as an effective catalyst for CO oxidation, and therefore had been loaded on a variety of supports to synthesis good catalysts. Many researchers have proved that the optimum Pd loading amount is around 2 wt%. Moreover, it was founded that the size of Pd particles affects the activity because the interface area, i.e. the active sites, can be changed upon the particle size. However, more intrinsic relationship between Pd particle size and catalytic activity remains unrevealed. By using TEM, XRD, CO-TPD and GC, we have proved that when Pd loading amount was around 2 wt%, the largest number of the optimum size particles for good catalytic performance was obtained. Furthermore, by synthesizing various sizes of Pd particles from 2 nm to 15 nm through controlling the different synthesis factors, we demonstrated that optimum Pd particle size exists for the excellent reaction activity, which was in a range of 4 ~ 7 nm. It may be attributed that Pd particle structures are changed as the particle size changes.