

Strong Metal-Support Interactions of Nanocatalysts

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Nanoparticles(NPs) have been widely utilized as an excellent catalyst for many catalytic reactions. Specific interfaces derived from metallic NPs and oxide supports greatly influence catalytic performance. Conventional industrial heterogeneous catalysts are mainly composed of active metals and oxide supports with high surface area. In our study, colloidal metallic NPs were incorporated into mesoporous oxides as a NP-solid catalyst. Knowledge of strong metal-support interactions obtained from the NP-solid catalyst system could be compared to that of the NP-NP catalysts which were consisted of metallic NPs on oxide NP arrays. Newly created interfaces between metal and oxide in nanocatalysts were demonstrated by enhancing catalytic reaction rate in CO oxidation and changed product selectivity in methanol oxidation. The utilization of elaborately designed NP catalysts and their specific interactions opens new possibilities for understanding interesting catalytic phenomena and for developing next-generation catalysts and efficient catalytic processes exhibiting 100 % selectivity, maximal activity, and long-term stability.