

Core-shell catalyst composed of Co_3O_4 , CuO , and CeO_2 in CO and hydrocarbon oxidation

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As environmental regulations for the pollutants have been greatly strengthened, it is necessary to remove CO and hydrocarbon at low temperature. The combination of improving fuel economy while oxidation of CO and hydrocarbon which functions well under 200 °C is highly desired.

According to previous studies, a ternary catalyst composed of Co_3O_4 , CuO , and CeO_2 showed high activity for oxidation. However, a serious drawback is a poor thermal stability of cobalt catalyst. To improve this, core-shell catalyst composed of Co_3O_4 , CuO , and CeO_2 which is denoted core-shell CCC catalyst was introduced and it shows the superior thermal stability and catalytic activities than pure Co_3O_4 or CuO or CeO_2 .

Co_3O_4 cubes were synthesized first as a core and this was coated by CeO_2 with CuO . The thickness of this CeO_2 with CuO shell could be modulated easily by varying the feeding molar ratio of Ce/Cu. In the following CO and hydrocarbon oxidation activity tests, core-shell CCC catalyst exhibited a rather high catalytic activity and characterization analysis was performed to investigate features of the catalyst.