

How Pt interacts with CeO₂ under the reducing and oxidizing environments at elevated temperature? The origin of improved thermal stability of Pt/CeO₂ compared to CeO₂

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Higher metal dispersion can be obtained via strong interaction between surface precious metal and support, such as ceria. Many catalytic reactions, including automotive catalytic reaction and water-gas-shift reaction, utilize such strong metal support interaction between precious metal and ceria to attain high catalytic activity. Therefore, understanding of metal-ceria interaction is crucial for providing rational design of ceria based catalysts.

In the present work, Pt-ceria interaction was analyzed in various aspects. Special attention is paid to investigate the effects of Pt loadings and various thermal treatments on metal support interaction. Consistent with previous reports, Pt is found to strongly interact with reducible surface oxygen (and surface oxygen vacancies) of ceria. Metal-support interaction facilitates high metal dispersion as well as the thermal stability enhancement of the ceria support.