

## Promoting Effects of Hydrothermal Treatment on Pd/CeO<sub>2</sub> for Diesel Oxidation

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Diesel oxidation catalyst (DOC) that works at low temperature below 150 °C is highly desired for modern diesel vehicles with high fuel efficiency and low pollutant emission. Also, diesel exhaust often undergoes harsh conditions, suffering from high temperature up to ~750 °C. These conditions cause small metal nanoparticles to sinter, losing a lot of active sites. In addition, carbonate and sulfate are formed on the catalyst surface during diesel oxidation, blocking the active sites with degraded activity. Therefore, DOC should have both high low-temperature activity and high durability against sintering and poisoning. In this work, we demonstrate that hydrothermal treatment on Pd/CeO<sub>2</sub> changes the catalyst structure, resulting in enhanced catalytic activity and durability. Hydrothermally treated Pd/CeO<sub>2</sub> completely removed all CO molecules at 75 °C. Also, this catalyst showed high durability for long-term reaction and sulfur poisoning. The reason of promoting effects was clearly investigated using TEM, XRD, CO chemisorption, TPD techniques, EXAFS, and in-situ DRIFT.