

### Highly Active Mesoporous RuO<sub>2</sub> catalyst Pretreated with O<sub>2</sub> for Room temperature CO oxidation

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Highly ordered mesoporous ruthenium dioxide (meso-RuO<sub>2</sub>) has been successfully synthesized by controlling the surface hydrophobicity of mesoporous silica template (KIT-6) via a nano-replication method. The meso-RuO<sub>2</sub> material, thus obtained, exhibits a well-defined mesostructure and high surface area (131 m<sup>2</sup> g<sup>-1</sup>). Pretreatment of the meso-RuO<sub>2</sub> catalyst under different gas environments (O<sub>2</sub>, H<sub>2</sub> and CO) strongly affects the catalytic activity towards CO oxidation. The meso-RuO<sub>2</sub>, pretreated by O<sub>2</sub> flowing at 200 °C, exhibited excellent catalytic activity for CO oxidation, 100% CO conversion with long-term stability at room temperature, whereas the meso-RuO<sub>2</sub> catalysts with pretreatment under other conditions are not very active at room temperature. It is found that the surface oxygen species, generated on the meso-RuO<sub>2</sub> during O<sub>2</sub> pretreatment at 200 °C, provide CO oxidation activity at room temperature.