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Selective Catalytic Reduction of Nitrogen Monoxide with H₂ or CO as Reductant in Presence of SO₂

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Ir/SiO₂ and Rh/SiO₂ catalysts showed excellent activity for NO reduction with CO or H₂ in the presence of O₂ and SO₂. Ir/SiO₂ catalyzed NO reduction with both CO and H₂, whereas Rh/SiO₂ catalyzed reduction only with H₂. The most important characteristic was that coexistence of O₂ and SO₂ is essential for NO reduction to occur. Surface science investigation using Ir(111) single crystal model catalyst revealed that the atomic sulfur was formed via disproportionation of SO₂ and reacted with oxygen adsorbed on the surface to form SO₂, which desorbed from the surface. Therefore, the iridium surface reverted to its initial metallic state. FT-IR measurements on Ir/SiO₂ also indicated that the SO₂ both stabilized and created Ir⁰ sites in the oxidizing atmosphere. The addition of Li and Ba to Ir/SiO₂ and Zn to Rh/SiO₂ was quite effective to enhance the catalytic activity for NO reduction in the presence of O₂ and SO₂ by acting as oxidation retardant to prevent deactivation of the active Ir and Rh metals supported on SiO₂.

Keywords: [Selective reduction](#), [Nitrogen monoxide](#), [Hydrogen](#), [Carbon monoxide](#), [Iridium catalyst](#), [Rhodium catalyst](#)

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