

# SUPPORTED PtRu CATALYSTS FROM A MIXTURE OF PLATINUM AND RUTHENIUM ACETYLACETONATE: CHARACTERIZATION AND ACTIVITY FOR ETHYLENE HYDROGENATION

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## Abstract

Supported bimetallic PtRu catalysts were prepared by adsorption of a mixture of Pt(acac)<sub>2</sub> and Ru(acac)<sub>3</sub> (acac = acetylacetonate) in toluene, onto  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and MgO and the organic ligands were removed by heat in H<sub>2</sub> flow at 300°C for 2 h. The nature of metal and interaction with each support was studied by temperature-programmed reductive decomposition (TPRD) and infrared (IR) spectroscopy. TPRD data did not indicate any contact between Pt and Ru atoms on both supports after the treatment. Ethylene hydrogenation over PtRu/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and PtRu/MgO catalysts were carried out at 1 atm from -50 to -9°C. The temperature dependence of ethylene hydrogenation of PtRu/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and PtRu/MgO prepared from acac precursors gave apparent activation energy 8.1 ± 0.1 and 6.0 ± 0.1 kcal/mol, respectively.

**Keywords:** Pt-Ru, acetylacetonate, alumina, magnesium oxide, ethylene hydrogenation