

# CHARACTERIZATION OF SUPPORTED PtRu CATALYSTS AND ACTIVITIES FOR ETHYLENE HYDROGENATION

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**ABSTRACT** Supported bimetallic PtRu catalysts were prepared by deposition a mixture solution of Pt(acac)<sub>2</sub> and Ru(acac)<sub>3</sub> (acac = acetylacetonate anion) in toluene on  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and MgO. The organic ligand of precursors could be removed completely after heated in H<sub>2</sub> flow at 300°C for 2 h. The nature of metal and interaction with support was studied by temperature-programmed reductive decomposition (TPRD), infrared (IR) and extended X-ray absorption fine structure (EXAFS) spectroscopy. The EXAFS data indicated high dispersion of Pt and Ru particles but none of Pt-Ru connections in both treated samples. Ethylene hydrogenation reaction over Pt-Ru/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and Pt-Ru/MgO catalysts were carried out at -40°C and 1 atm. The temperature dependence of ethylene hydrogenation of both catalysts gave apparent activation energy of  $8.1 \pm 0.1$  and  $6.0 \pm 0.1$  kcal/mol, respectively.

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