Ru Nanoparticles with fcc Structure for High-activity Catalyst

Prof. Hiroshi KITAGAWA (Kyoto University)

1. Ruthenium Nanoparticles

Ruthenium is extensively used as catalyst:
- Organic synthesis
- CO removal from car exhaust or fuel-cell systems

However, the conventional synthesis process results in merely the hcp-Ru, meaning that there was no convenient way able to produce fcc-Ru nanoparticles.

This study successfully meet the demand for synthesizing fcc-Ru nanoparticles, serving as high-active catalyst.

fcc : face-centered cubic
hcp : hexagonal closed packed structure

2. NOVEL Synthesis Process

- Substantial fcc-Ru nanoparticles
- Single-step synthesis
- Particle size controllable

Ruthenium(III) Acetylacetonate (Ru(acac)₃) starting material in organic solvent
Tryethyleneglycol (TEG) reducing agent
Polyvinylpyrrolidone (PVP) protecting agent

fcc-Ru nanoparticles

Particle size is controllable by varying the synthesis condition.

3. CO Oxidation Catalyst

- The fcc-Ru catalyst oxidizes carbon monoxide at lower temperature than hcp-Ru catalyst.

4. Patent available for licensing

JP, US

Contact : Miho OKISHIRO (JST)
phone:+81-3-5214-8486
e-mail: license@jst.go.jp

Condition: Catalyst Quantity :0.075 g, Al₂O₃(y)-supported Ru
Reaction Gas :He/CO/O₂ = 49/0.5/0.5 (cc/min)
Reaction temperature :150 °C～