

PdRu Solid-Solution Alloy Nanoparticles with Enhanced CO Oxidation Activity

Prof. Hiroshi KITAGAWA (Kyoto University)

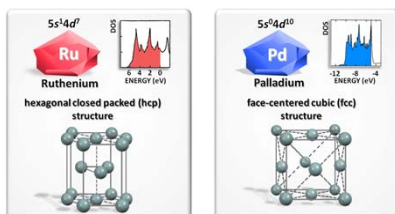
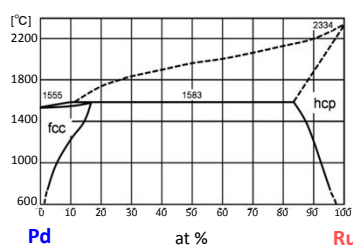
1. Solid-Solution Alloy

- Mixed metal at the atomic level
- Have the advantage of easily controlling chemical and physical properties by changing in compositions and/or combinations

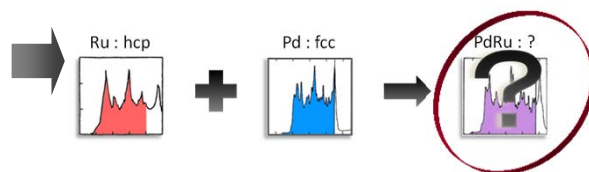


However...

Solid-solution phases are limited by combinations, compositions and/or temperature.

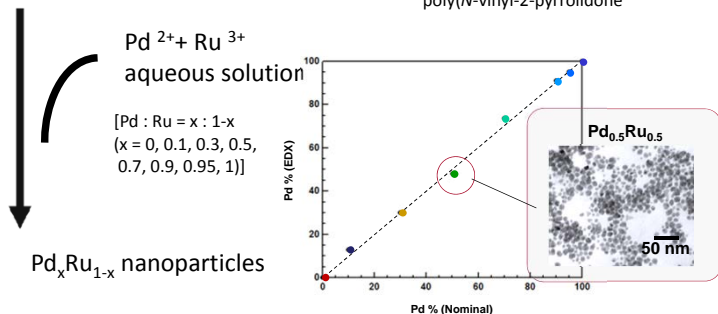


PdRu solid-solution alloys had not yet obtained....

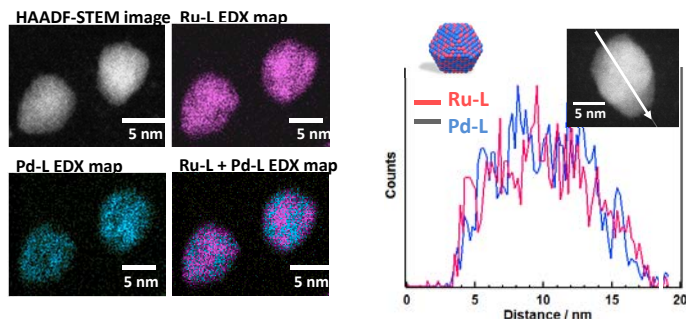


2. NOVEL Synthesis Process

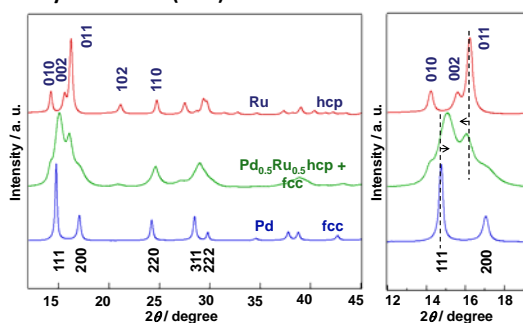
Triethyleneglycol (Reducing agent) + PVP (Protecting agent)
poly(N-vinyl-2-pyrrolidone)



- Elemental Mapping Images of Pd_{0.5}Ru_{0.5} NPs
- Compositional Line Profiles

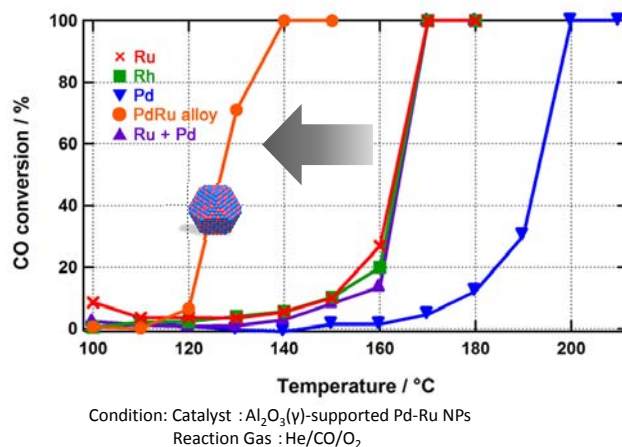


- Powder X-ray Diffraction (XRD) Patterns



3. CO Oxidation Catalyst

- The Pd-Ru solid-solution alloy oxidizes carbon monoxide at much lower temperature..



The Pd-Ru solid-solution alloy performs significantly higher activity than any of other metal nanoparticles in single phase, so it is expected to serve as a high-performance catalyst surpassing the conventional catalysts.

4. Patent available for licensing

Patent No. : JP 2012-204292
(International application is in preparation.)
Contact : Miho OKISHIRO (JST)
phone: +81-3-5214-8486
e-mail: license@jst.go.jp