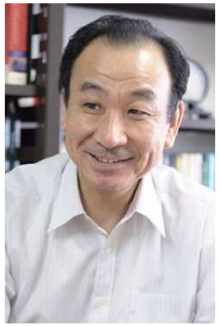
Synthesis of Ceria Nanoparticle-Assembled Hollow Mesoporous Silica Composite Particles

Department of Chemical Engineering
Graduate School of Engineering
Tohoku University

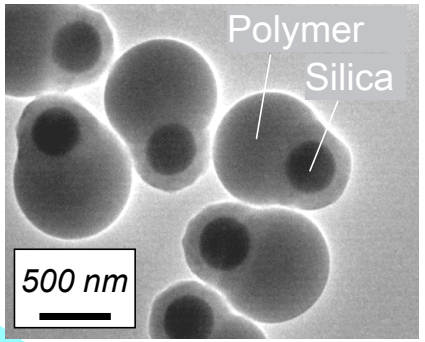
Konno Lab.

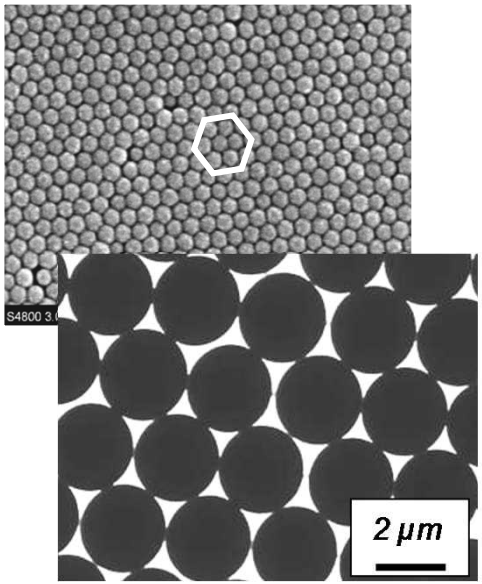


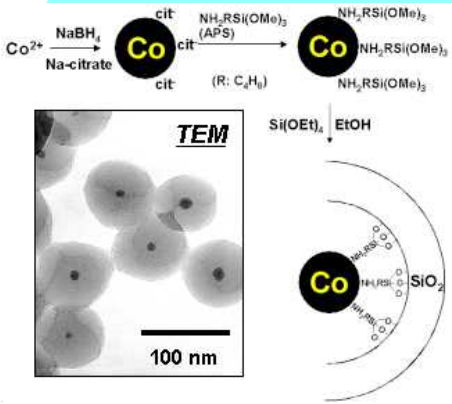
Mikio Konno

■Our core technology

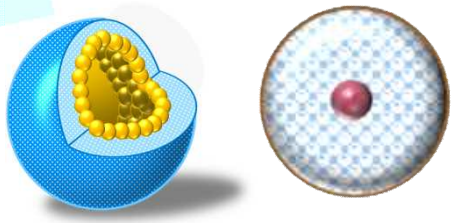
- Monodisperse particles
  (Silica, Polymer, *etc.*)
- Silica or polymer coatings of particles
- Inorganic-organic hybrid materials







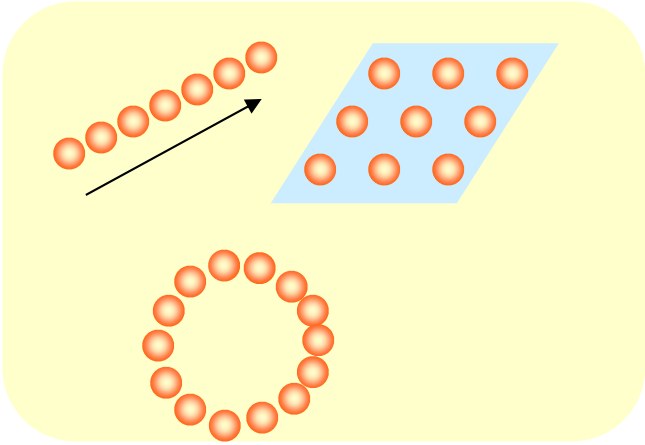
■Catalyst particle design



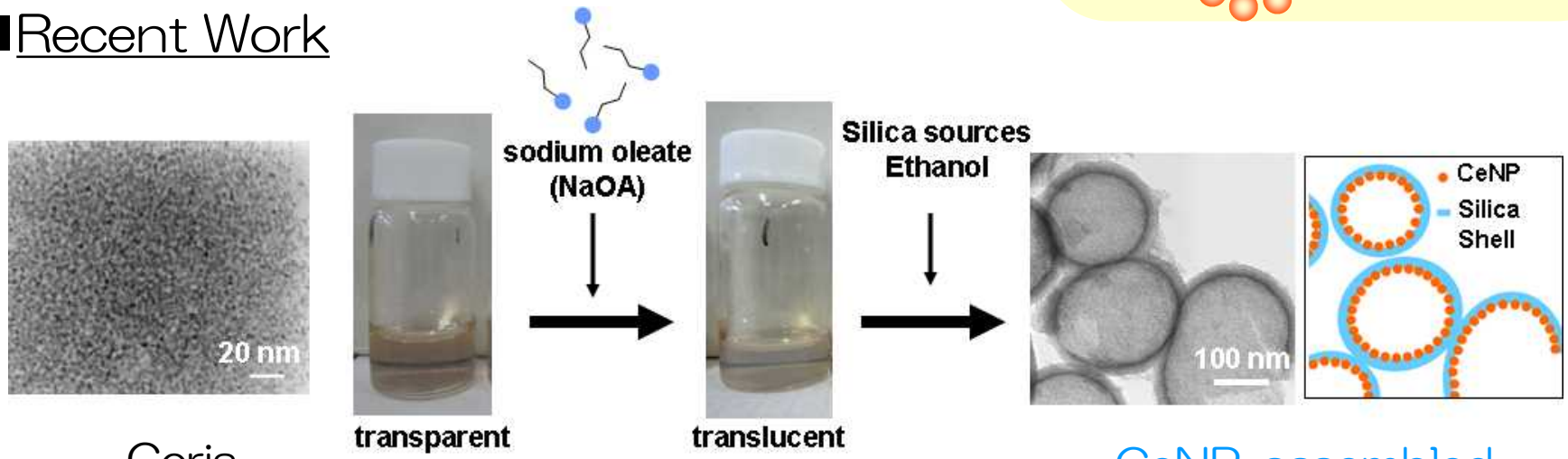
■Nanoparticle assembly

- shows novel functions different from that of nanoparticle itself
- improves catalytic perfomances

  (high-activity, thermostability, reusability)



■Recent Work



Ceria nanoparticles (CeNPs, *ca.* 3 nm)

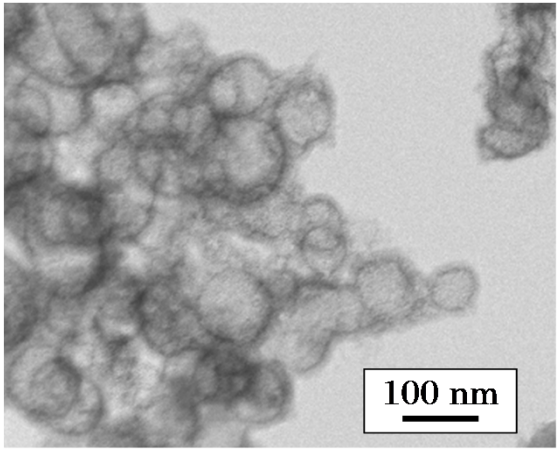
CeNP-assembled hollow mesoporous silica particles

H. Ishii, S. Ito, D. Nagao, M. Konno, *Colloid Surf. A* 2014, 441, 638.

■ Structures obtained were

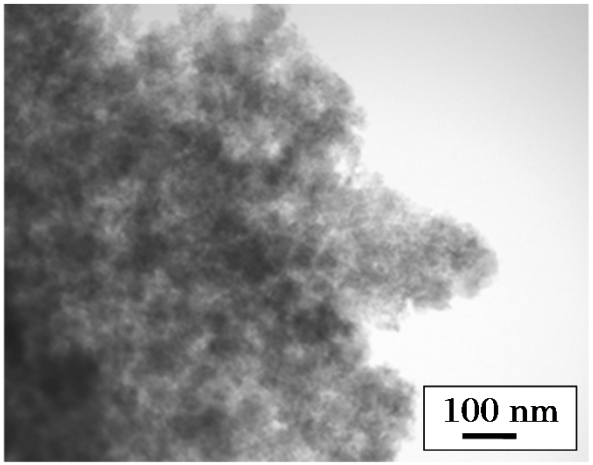
- pH- dependent
- ceria nanoparticle inside, silica outer shell

7 < pH < 10

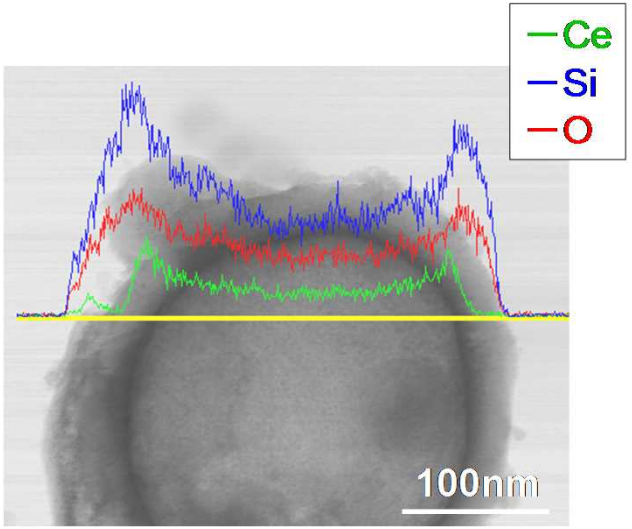


Hollow Particle

pH > 10



Aggregates

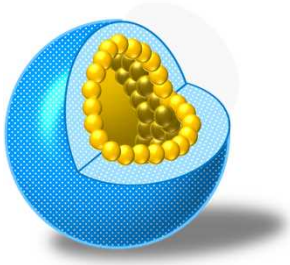


black layer : ceria
outer layer : silica

■ Particles obtained are

-thermostable

-used for automotive catalysts



for