

SUNADA LAB.

[Precise Design of Functional Metal Clusters]



Institute of Industrial Science, Research Center for Sustainable Material Energy Integration

Functional Metal Cluster Science

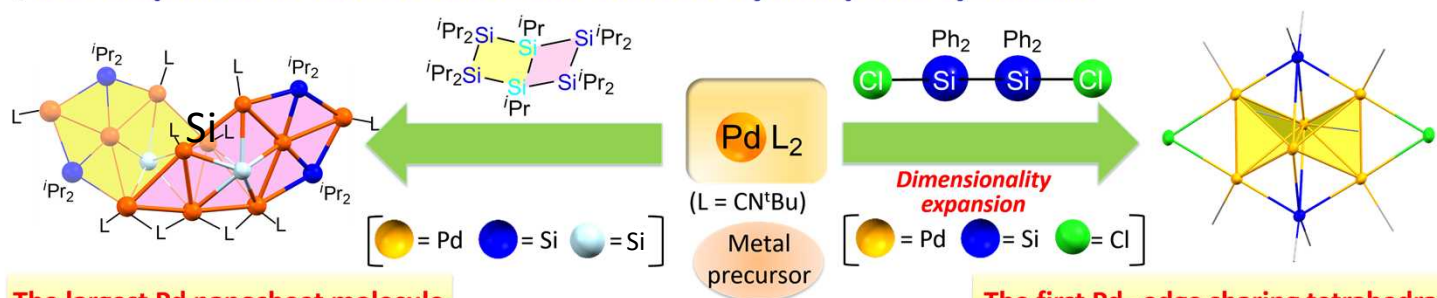
Department of Applied Chemistry

<http://www.sunadalab.iis.u-tokyo.ac.jp>

Development of well-designed metal clusters

Nanosized metal compounds have attracted much interests owing to their own unique properties attributed to the nanosized effect. Our research interests focus on the design and synthesis of a series of well-defined nanosized transition metal clusters, and their application as functional materials.

◆ Development of nanosized metal clusters by template synthesis



The largest Pd nanosheet molecule

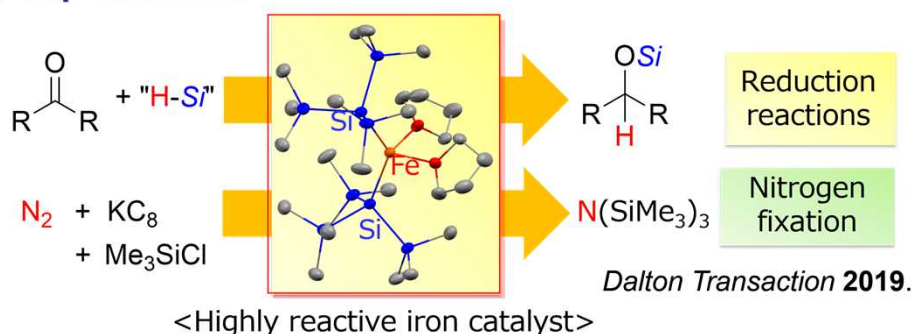
(*Nature Communications* 2013.)

The first Pd₆-edge sharing tetrahedra

(*Chemistry – A European Journal* 2019. Press release by IIS.)

- ✓ Well-designed metal cluster can be synthesized by “template synthesis”
- ✓ Metal arrangement can be finely tuned by “ligand exchange”
- ✓ Application as catalysts, photo- and electronic- devices

◆ Synthesis of novel complexes consisting of both transition metal and the main group elements



Reduction reactions

Nitrogen fixation

Dalton Transaction 2019.

- ✓ Development of new iron-based catalyst showing high reactivity.
- ✓ A variety of catalysis are realized without the use of precious metal catalysts.