SUNADA LAB.

[Design and synthesis of metal clusters and their applications]

Institute of Industrial Science, Department of Materials and Environmental Science

Functional Metal Cluster Science

Engineering/Applied Chemistry

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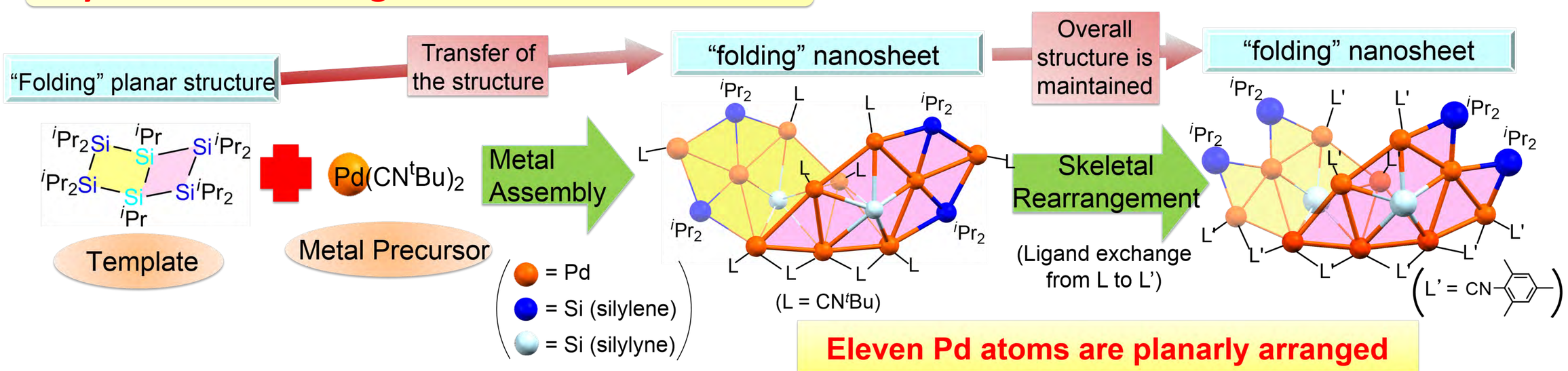
Development of well-designed metal clusters

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 template synthesis of nanosized metal clusters

＜Synthesis of “folding” Pd11 nanosheet＞



Eleven Pd atoms are planarly arranged

Sunada, Y. et al., *Nature Communications* **2013**, 4, 1/3014 – 7/3014.

✔ Well-designed metal cluster can be effectively 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 of carbonyl compounds
- Medical and agrochemical intermediates
- Hydrogenation
- Medical and agrochemical intermediates
- Hydrosilylation
- Synthesis of silicone materials
- C-H bond functionalization
- Extremely Difficult Substrate Conversion

✔ Development of new iron-based catalyst having disilametallacycle skeleton

✔ A variety of catalysis are realized without the use of precious metal catalysts.

Angew. Chem. Int. Ed., **2009**, *48*, 9511.
Chem. Commun., **2011**, *47*, 6581.
Dalton Trans. **2013**, *48*, 16687.
Organometallics **2014**, *33*, 5936.
Organometallics **2015**, *34*, 2896.