

Introverted Phosphorous-Au Cavitands for Catalytic Use

(Graduate School of Science and Technology, Ryukoku University)

○KANAURA, Mao; IWASAWA, Tetsuo

Keywords: Introverted functionality; Cavitand; Supramolecular catalysis; Triquinoxaline-spanned resorcinarene; Gold catalyst

Natural receptors like enzymes and RNA strands have functional groups oriented inwardly for molecular recognition. Amino acid functional groups converge to create reactive sites inside the hydrophobic pockets, and the grooves of nucleic acids are also concave and lined with convergent functionality for folding around guest substrates. Thus they serve as incredibly well-organized chemical catalysts for performing numerous biological operations. Inspired by these, organic chemists have pursued to develop artificial receptors bearing functional substituents inside chemical space. However, introverted functional groups have not been developed into a powerful synthetic-platform.¹ Overcoming this drawback perhaps will allow cavitands to make more significant inroads in the synthetic community.

Herein a preparative synthesis of inwardly directed phosphoramidite-Au complex is reported, including a description of some of its catalytic performance.² The molecular structure was determined by crystallographic analysis, which disclosed that the phosphoramidite ligand points “out” placing the complexed Au “in” (Figure 1). We investigated its catalytic activities and find that the inwardly directed Au is surrounded by three inert walls providing new opportunities for supramolecular catalysis.

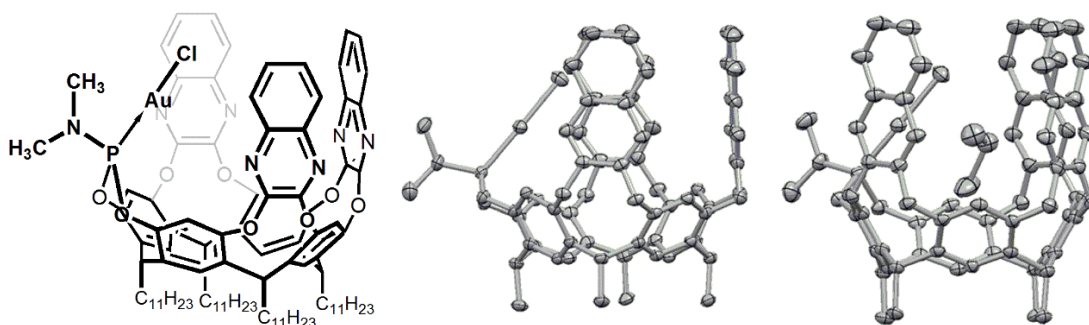


Figure 1. An introverted phosphoramidite-Au cavitand.

References

- 1) a) Kanaura, M.; Ito, K.; Schramm, M. P.; Ajami, D.; Iwasawa, T. *Tetrahedron Lett.* **2015**, 56, 4824-4828. b) Ohashi, K.; Ito, K.; Iwasawa, T. *Eur. J. Org. Chem.* **2014**, 1597-1601.
- 2) Schramm, M. P.; Kanaura, M.; Ito, K.; Ide, M.; Iwasawa, T. *Eur. J. Org. Chem.* **2016**, in press.