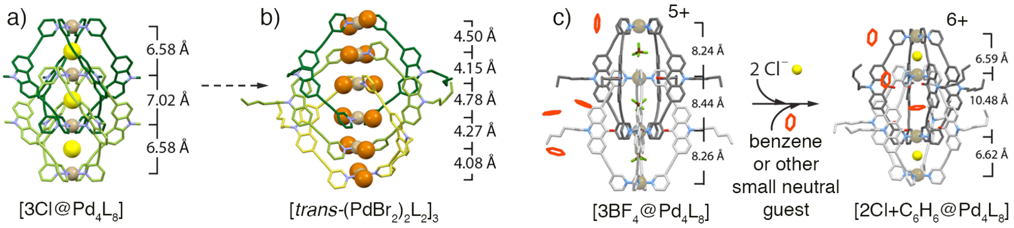
注意　日程再変更

第666回　化学・物質工学セミナー

日時： 平成28年1月28日（木）14:30～16:00
場所： 総合教育研究棟　多目的ホール
講演題目；Guest-binding and Structural Reorganization in Stimuli-responsive Coordination Cages
講演者；Guido H. Clever 教授（ドルトムント工科大学）

Banana-shaped bis-monodentate ligands form the basis of a family of coordination cages whose members show variable topologies, a rich encapsulation chemistry and several functional features.[1] Among these, switchable host-guest systems are of particular interest because they promise to find application in fields such as uptake & release of molecular cargo, sensing and separation as well as catalysis inside confined molecular environments. Our current research efforts focus on the triggering of structural reorganizations and the implementation of reversible control over the size and shape of the cages' internal cavities.

Previously, we have reported a dibenzosuberone-based interpenetrated double-cage [$Pd_4Ligand_8$] which is capable of allosteric anion binding with a tremendous affinity for the inclusion of two chloride anions in its outer pockets.[2] Subsequently, the anion selectivity of the cages could be adjusted by the size of the anionic template in the central pocket.[3] In contrast, another double-cage derivative was now shown to bind neutral guests inside its central pocket upon activation with halide anions (Fig. c).[4] Yet another example allowed for switching of the overall cage architecture (monomeric vs. dimeric vs. triple-catenated, Fig. a-b) by gradually increasing the concentration of anionic triggers.[5] Based on this work, we further showed, that the interpenetration principle can be extended onto other functional backbones such as the electron donor phenothiazine.[6] In mixed-ligand cages containing additional ligands that serve as electron acceptors, light-induced charge transfer could be observed by pump-probe spectroscopy. In another example, light of different wavelengths was used as a trigger to reversibly switch guest uptake and release in a photochromic coordination cage based on dithienylethene (DTE) ligands.[7] Upon slight changes in the ligand design, light was shown to induce a complete structural reorganization of the self-assembled system.



References

[1] M. Han, D. M. Engelhard, G. H. Clever, *Chem. Soc. Rev.* **2014**, *43*, 1848.
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[3] S. Freye, R. Michel, D. Stalke, M. Pawliczek, H. Frauendorf, G. H. Clever, *J. Am. Chem. Soc.* **2013**, *135*, 8476.
[4] S. Löffler, J. Lübben, L. Krause, D. Stalke, B. Dittrich, G. H. Clever, *J. Am. Chem. Soc.* **2015**, *137*, 1060.
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[6] M. Frank, J. Hey, I. Balcioglu, Y.-S. Chen, D. Stalke, T. Suenobu, S. Fukuzumi, H. Frauendorf, G. H. Clever, *Angew. Chem. Int. Ed.* **2013**, *52*, 10102.
[7] M. Han, R. Michel, B. He, Y.-S. Chen, D. Stalke, M. John, G. H. Clever, *Angew. Chem. Int. Ed.* **2013**, *52*, 1319.

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