

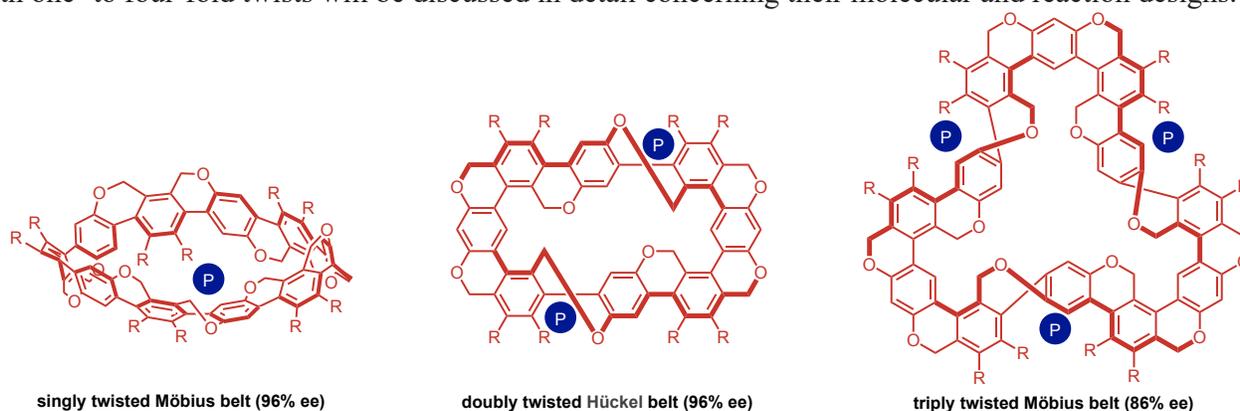
Asymmetric Synthesis of Chiral Nanocarbons by Rh-Catalyzed [2+2+2] Cycloaddition

Ken Tanaka

Department of Chemical Science and Engineering, Tokyo Institute of Technology

e-mail: ktanaka@apc.titech.ac.jp

Non-planar chiral nanocarbons are of interest for their electronic and supramolecular properties and dynamic behavior, which are different from those of planar nanocarbons. In this presentation, I will report on the (asymmetric) synthesis of various cyclophenylene belts by Rh-catalyzed intramolecular [2+2+2] cycloadditions, as well as cycloparaphenylenes and cage molecules by Rh-catalyzed intermolecular [2+2+2] cycloadditions. Furthermore, the asymmetric synthesis of Möbius- and Hückel-type cyclophenylene belts with one- to four-fold twists will be discussed in detail concerning their molecular and reaction designs.



- 1) Miyauchi, Y.; Johmoto, K.; Yasuda, N.; Uekusa, H.; Fujii, S.; Kiguchi, M.; Ito, H.; Itami, K.; Tanaka, K. *Chem. Eur. J.* **2015**, *21*, 18900.
- 2) Hayase, N.; Miyauchi, Y.; Aida, Y.; Sugiyama, H.; Uekusa, H.; Shibata, Y.; Tanaka, K. *Org. Lett.* **2017**, *19*, 2993.
- 3) Hayase, N.; Sugiyama, H.; Uekusa, H.; Shibata, Y.; Tanaka, K. *Org. Lett.* **2019**, *21*, 3895.
- 4) Hayase, N.; Nogami, J.; Shibata, Y.; Tanaka, K. *Angew. Chem. Int. Ed.* **2019**, *58*, 9439.
- 5) Nishigaki, S.; Shibata, Y.; Nakajima, A.; Okajima, H.; Masumoto, Y.; Osawa, T.; Muranaka, A.; Sugiyama, H.; Horikawa, A.; Uekusa, H.; Koshino, H.; Uchiyama, M.; Sakamoto, A.; Tanaka, K. *J. Am. Chem. Soc.* **2019**, *141*, 14955.
- 6) Nogami, J.; Tanaka, Y.; Sugiyama, H.; Uekusa, H.; Muranaka, A.; Uchiyama, M.; Tanaka, K. *J. Am. Chem. Soc.* **2020**, *142*, 9834.
- 7) Nogami, J.; Miyamoto, K.; Muranaka, A.; Nagashima, Y.; Uchiyama, M.; Tanaka, K. *Chem. Sci.* **2021**, *12*, 7858.
- 8) Nogami, J.; Nagashima, Y.; Tanaka, Y.; Sugiyama, H.; Uekusa, H.; Muranaka, A.; Uchiyama, M.; Tanaka, K. *Angew. Chem. Int. Ed.* **2022**, *61*, e202200800.
- 9) Wang, L.-H.; Nagashima, Y.; Abekura, M.; Uekusa, H.; Konishi, G.; Tanaka, K. *Chem. Eur. J.* **2022**, *28*, e202200064.
- 10) Kawai, Y.; Nogami, J.; Nagashima, Y.; Tanaka, K. *Chem. Sci.* **2023**, *14*, 3963.
- 11) Sato, Y.; Abekura, M.; Oriki, T.; Nagashima, Y.; Uekusa, H.; Tanaka, K. *Angew. Chem. Int. Ed.* **2023**, *62*, e202304041.
- 12) Nogami, J.; Hashizume, D.; Nagashima, Y.; Miyamoto, K.; Uchiyama, M.; Tanaka, K. *Nat. Synth.* **2023**, *2*, ASAP. 10.1038/s44160-023-00318-2