Möbius Zn(II) hexaphyrin complexes with switchable chirality

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Among the various types of chirality (central, axial, helical, planar…), that inherent to Möbius topology remains almost unexplored, partly due to the difficult access to Möbius compounds.[1] Considering the paramount importance of chirality in biological processes, drug design, material sciences and many other fields, scrutinizing Möbius chirality could benefit to a large community of researchers. Currently, the asymmetric preparation of Möbius compounds remains challenging. One strategy relies on stereochemically stable Möbius ring, only two examples being described in the literature.[2] Focusing on the Möbius [28]hexaphyrin scaffold, our group has investigated a different approach for chirality induction taking advantage of the dynamic character of the twisted π system.[3] Indeed, this scaffold is conformationally flexible and undergoes rapid *P* ↔ *M* equilibrium in solution, thus exhibiting a dynamic Möbius chirality. This feature enables a transfer of chirality from an exogenous stereogenic source under thermodynamic control, useful to build up adaptative systems. Möbius Zn(II) metallo-receptors exhibiting a strong interplay between aromaticity, guest recognition, and chirality transfer have been revealed, opening a new playground.

Recently, we have extended our dynamic approach to a different situation, where a source of fix chirality is part of a covalently attached coordinating arm, leading to the following main findings: (i) both Möbius configurations are reached *in-situ* by simple addition of suitable achiral effectors tuning the way a fix stereogenic source interacts with the ring. Impressive stereoselectivities (diast. excess > 95%) highlight the most efficient transfer of chirality to a Möbius ring reported so far; (ii) these achiral effectors generate distinct chiroptical states featuring electronic circular dichroism spectra with bisignate Cotton effect of opposite signs. Switching between these two states owing to ligand exchange was successfully achieved with high robustness using a chemical trigger (10 cycles).[3f]

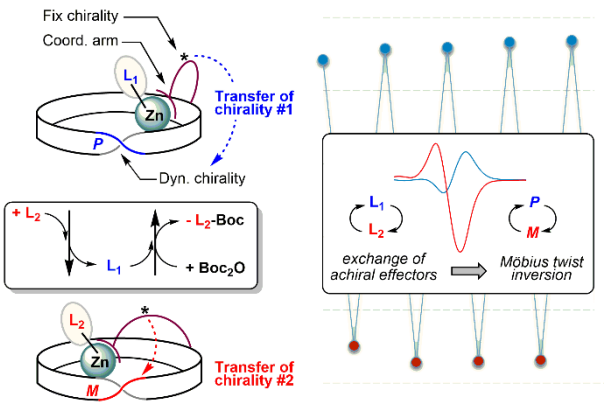

Figure 1. Working principle of a Möbius-type chiroptical switch.

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