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► **To cite this version:**

Gwénaél Rapenne. Role of chirality in the unidirectionality of rotating molecular motors and gears. *Pacificchem*, Dec 2021, Honolulu, United States. ⟨hal-04637313⟩

HAL Id: hal-04637313

<https://hal.science/hal-04637313v1>

Submitted on 5 Jul 2024

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Role of chirality in the unidirectionality of rotating molecular motors and gears

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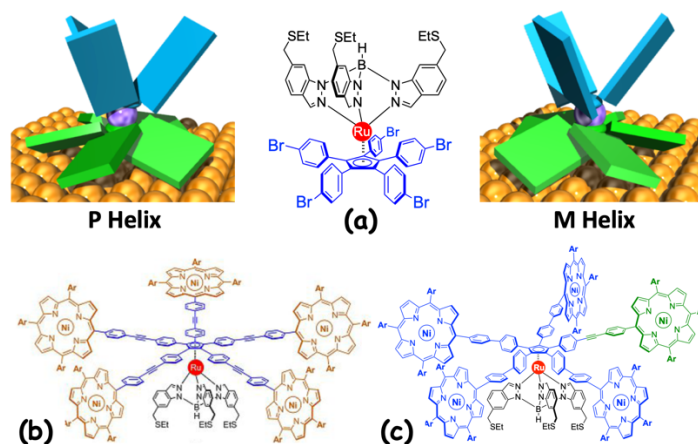
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Advances in the imaging and manipulation of single molecules by STM has stimulated much interest in the studies of molecular machines at the single molecular level,^[1]

In this presentation will be presented the design and synthesis of two molecular motors and gears built around a ruthenium(II) or an europium(III) center. The ruthenium motor can be rotated in a clockwise or counterclockwise direction by selective electron tunneling through different sub-units of the molecule.^[2] The europium rotor showed the synchronized rotation in a network on very long distances under the electric-field induced by the STM tip.^[3] These complexes are also exploited as a central platform for molecular gears where the helical chirality is of prime importance.^[4] The synthesis of 8 prototypes of helical molecular gears with three paddles (a) and five paddles with a symmetric^[5] (b) and dissymmetric^[6] (c) structures will be presented as well as some STM studies on Au(111) surface. The role of chirality in the unidirectional processes of both motors and gears will be emphasize.



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