

## FUNCTIONALIZED POLYETHER MACROCYCLIC COMPOUNDS AND USE THEREOF AS LUMINESCENT MARKERS

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| <b>Reference</b>         | #1039-A976  |
| <b>Patent status</b>     | <ul style="list-style-type: none"> <li>• European priority patent application EP18171912.1 filed on May 11<sup>th</sup>, 2018</li> <li>• PCT patent application PCT/EP2019/061997 filed on May 10<sup>th</sup>, 2019</li> </ul> |
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| <b>Commercial status</b> | Exclusive or non-exclusive license<br>Collaboration   |
| <b>Key words</b>         | Functionalized macrocycles, circularly polarized luminescence (CPL), switching, electronic circular dichroism (ECD), excimer fluorescence (EF)  |

### Context

The invention relates to the efficient large-scale synthesis of macrocycles using simple cyclic ethers and diazoketoester as reagents. Resulting unsaturated derivatives, denominated 18C6, 18C4 or 16C4, react with aromatic amines to form chiral functionalized scaffolds through tandem amidation/olefin transposition processes. They displaying bright circularly polarized light emission and use thereof as luminescent markers.

### Technical description

By introducing pyrenes as aromatic nuclei, inventors develop a family of enantiopure chiroptical switches with a large and tunable wavelength emission range. A variety of fluorophores were selected and introduced on different macrocyclic scaffolds (>10 examples). In presence of metal ions ( $\text{Na}^+$ ,  $\text{Ba}^{2+}$ ) ECD signals can be almost completely reversibly inverted and CPL signal is reversibly quenched, establishing a rare combined reversible switching of ECD and extinction of CPL behavior for the designed macrocycles.

### Development stage

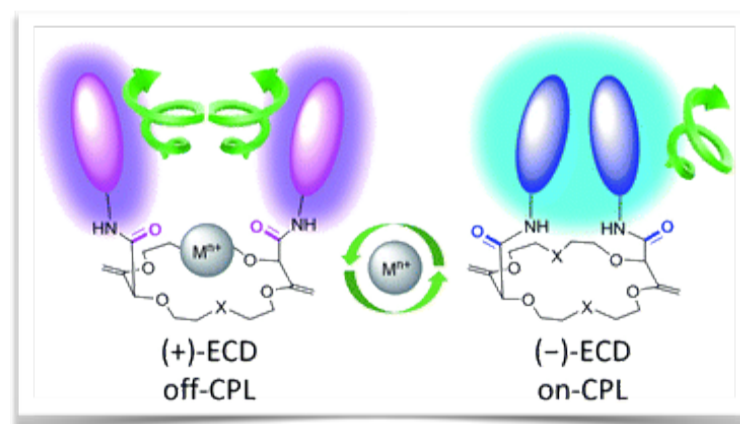
Various compounds already synthesised

### Benefit

- Possibility of functionalization with different fluorophores to span UV and visible emission wavelengths
- High CPL ( $g_{\text{lum}} \sim 10^{-2}$ ) associated with excimer fluorescence
- Reversible (CPL) switches

### Industrial applications

- Security inks
- Organic light emitting diodes (OLED)
- Fluorescent tags for marking substances: documents, commercial products, proteins, nucleotides, cells, or tissues



*Model for reversible switching.*  
Homberg *et al.*, Chem. Sci. 2018, 9, 7043-7052