Sensing Chiral Monoamines

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Point-to-Axial Chirality Transfer – A New Probe for “Sensing” the Absolute Configurations of Monoamines.

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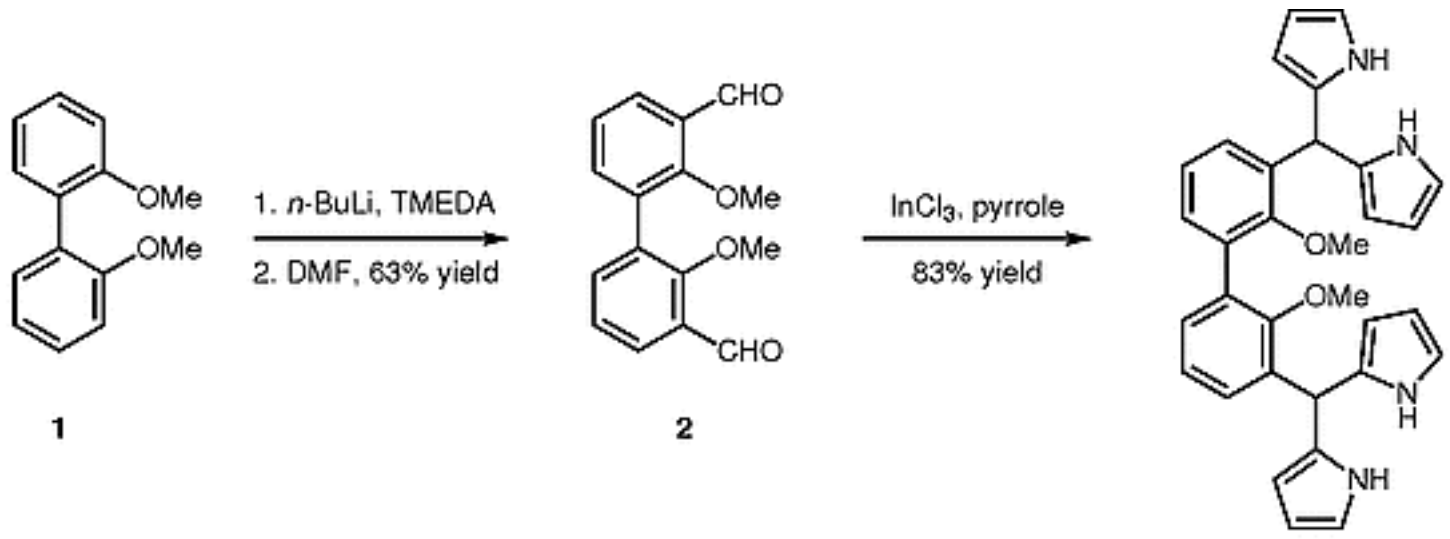
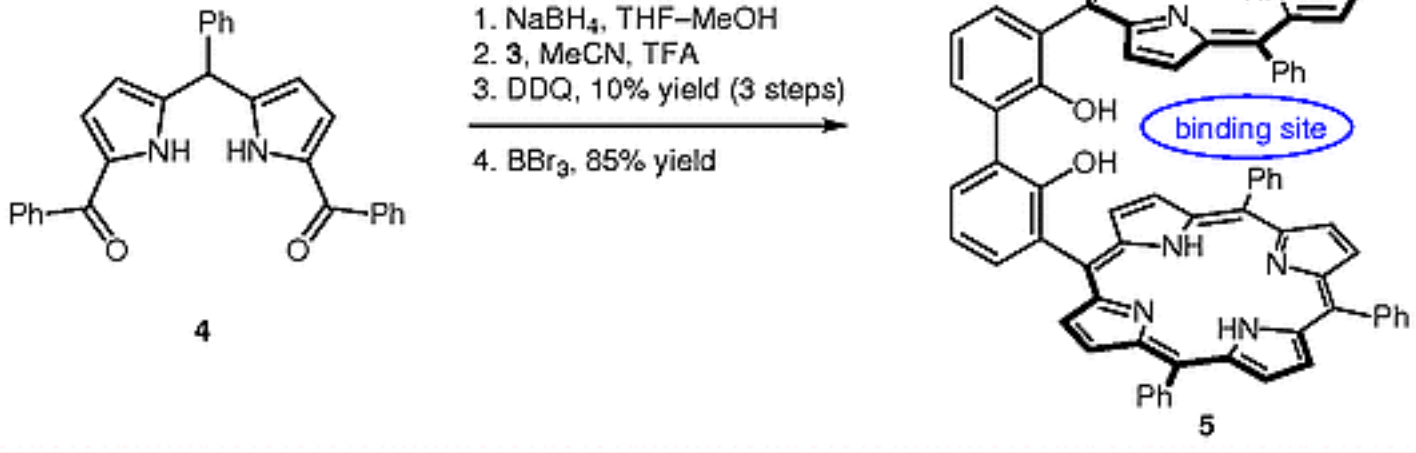
Key words

porphyrin - chirality sensing - host–guest complexes





Significance

The authors report the synthesis of a novel molecule, the 3,3′-bisporphyrin-substituted 2,2′-biphenol **5**, for chirality sensing of monoamines via exciton-coupled circular dichroism (ECCD). The design strategy includes incorporating a bulky chromophoric pocket, created by the tetraphenyl porphyrins (the host), with diols to form hydrogen bonds with the chiral monoamines (the guest). The resulting host–guest complexes would favor either P or M depending on the chirality of the bound guest through minimizing steric interactions.

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Comment

The assessment of stereochemistry is central to synthetic organic chemistry. The design strategy employed here could be further developed for sensing other functional groups. Synthesis of **5** starts from the formation of bis-aldehyde **2**, followed by condensation with pyrrole to produce **3**. Reduction of **4** generates a dipyrromethane dicarbinol which is condensed with **3** under acidic conditions, followed by DDQ oxidation and demethylation. A high-yielding synthesis of porphyrin is hard to achieve; however, this work demonstrates the synthesis of **5**, which has two porphyrin units.

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