Synthesis and Applications of Planar Chiral [2.2]Paracyclophanes

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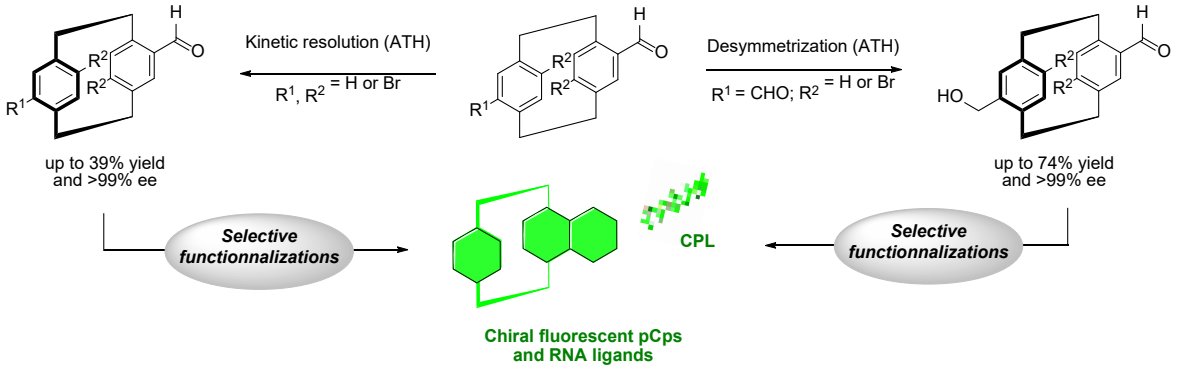
Originally discovered in a serendipitous fashion by vapor phase pyrolysis of *p*-xylene [1], [2.2]paracyclophanes (pCps) have rapidly gained popularity amongst chemists due to their unique three-dimensional architecture [2] that can give rise to planar chirality [3]. Despite their advantageous physicochemical properties and potentially wide range of applications, optically active pCps are still mainly obtained through enantiomer separation by chromatography on chiral stationary phases. The optimization of new asymmetric processes providing a practical access to enantiopure pCps can therefore be considered as a priority in modern cyclophane chemistry.

Our group has developed a general approach based on asymmetric transfer hydrogenations (ATH) for controlling the planar chirality of a range of substituted pCps. This strategy enables us to perform both the kinetic resolution of racemic compounds [4] and the desymmetrization of centrosymmetric *meso* derivatives [5] on synthetically useful scales. The obtained enantioenriched molecules, which incorporate different reactive groups on each ring of the pCp core, can be used as key intermediates for the preparation of new circularly polarized light (CPL) emitting dyes [6-7] and RNA ligands [8]. Based on its broad applicability, our method should constitute an extremely useful tool to rapidly access complex pCps in their enantiopure form. This convenient approach may reveal useful to further expand the range of applications of these original planar chiral objects in different research fields.



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