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Stepwise functionalization of a pillar[5]arene-containing [2]rotaxane with pentafluorophenyl ester stoppers

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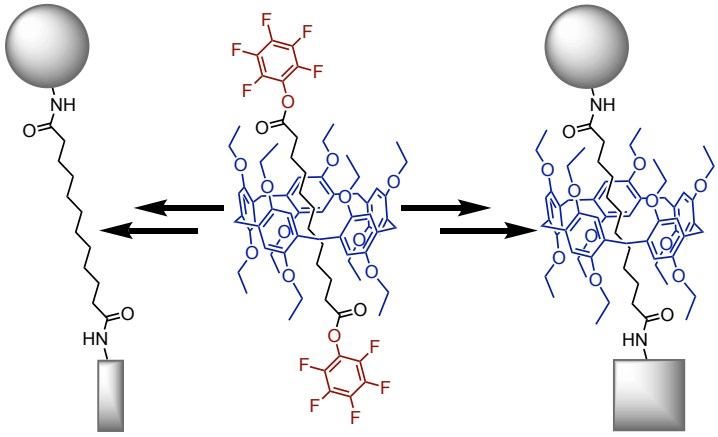
The direct preparation of rotaxanes from pillar[5]arene-based inclusion complexes is highly dependent on the nature of the reagents even when similar reactions are used for their synthesis and yields are often quite moderate.[1] To solve this problem, our group has developed the preparation of pillar[5]arene-containing [2]rotaxane building blocks allowing their efficient post-modification by a stopper exchange reaction.[2] Very recently, we have also shown that the reactivity of symmetrical pillar[5]arene-based building block is affected by the presence of the macrocyclic subunit.[3] Indeed, the first stopper exchange reaction is fast while the second always significantly slower thus allowing selective mono-functionalization of the rotaxane building block in high yields. Introduction of a second stopper is then possible to generate dissymmetrical rotaxanes or axles in high yields. Moreover, we have also shown that the pillar[5]arene moiety can act as a protecting group allowing the efficient synthesis of unsymmetrically substituted compounds particularly difficult to prepare from a bifunctional starting material lacking the macrocyclic moiety.



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