

Controlling chirality in the synthesis of 4 + 4 diastereomeric amine macrocycles derived from *trans*-1,2-diaminocyclopentane and 2,6-diformylpyridine

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Streszczenie

A few suitably long dialdehyde and primary diamine building blocks of a predetermined chirality have been designed and synthesized to enable controlled and efficient synthesis of all six possible diastereomers of 4 + 4 macrocyclic amine derived from *trans*-1,2-diaminocyclopentane (DACP) and 2,6-diformylpyridine (DFP) units. Although two out of six diastereomers have been reported recently, their synthesis presented here is more direct and occurs with an improved yield. This family of 4 + 4 macrocycles contains one pair of homochiral enantiomers of identical *RRRRRRRR* and *SSSSSSSS* configurations of DACP units, two different *meso* forms (*meso I* of alternating *RRSSRRSS* and *meso II* of neighboring *RRRRSSSS* configuration of DACP moieties) as well as one pair of heterochiral enantiomers, where configuration of one diamine fragment is opposite to the other three diamine parts, *RRRRRRSS* and *SSSSSSRR*, respectively. The structures of each type of macrocycle in solid state have been confirmed by single crystal analyses of a macrocyclic amine in its suitable protonated form. The different symmetry of each type of macrocycle in solutions has been proved by ^1H and ^{13}C NMR spectra of their hydrochloride derivatives. The chiral nature of two different pairs of optically active enantiomers has been established by circular dichroism spectra. These chiral 4 + 4 diastereomeric macrocycles are receptors for chiral guests and recognize in solution 10-camphorsulfonic acid as well as chiral tartaric acid.

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