N-Benzyl- und N-Heptyl-substituierte Tetraazacyclododecane

N-Benzyl and N-Heptyl Substituted Tetraazacyclodecanes

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1,5-Bis(methylsulfonyloxi)-3-aza-3-*p*-toluenesulfonylamidopentane (**1**) reacts with 4-benzyl-1,7-bis(*p*-toluenesulfonyl)diethylenetriamine (**2**) and 4-benzyl-1,7-bis(*p*-nitrophenylsulfonyl)diethylenetriamine (**3**) and Cs_2CO_3 yielding 1-benzyl-4,7,10-tris(*p*-toluenesulfonyl)-1,4,7,10-tetraazacyclododecane (**9a**) and 1-benzyl-4,10-bis(*p*-nitrophenylsulfonyl)-7-*p*-toluenesulfonyl)-1,4,7,10-tetraazacyclododecane (**10a**), respectively. The corresponding dimers 1,13-bis(benzyl)-4,7,10,16,19,22-hexa(*p*-toluenesulfonyl)-1,4,7,10,13,16,19,22-octaazacyclotetracosane (**9b**) and 1,13-bis(benzyl)-4,10,16,22-tetra(*p*-nitrophenylsulfonyl)-7,19-bis(*p*-toluenesulfonyl)-1,4,7,10,13,16,19,22-octaazacyclotetracosane (**10b**) could not be isolated but detected by mass spectroscopy. The reactions of **1** with 4-heptyl-1,7-bis(*p*-nitrophenylsulfonyl)diethylenetriamine (**5**) and Cs_2CO_3 results in the formation of 1-heptyl-4,10-bis(*p*-nitrophenylsulfonyl)-7-*p*-toluenesulfonyl)-1,4,7,10-tetraazacyclododecane (**11**) and **1** reacts with 4-benzyl-diethylenetriamine (**4**) and $Cu(O_2CCH_3)_2$ forming the dimeric copper complex $[\{C_6H_5CH_2N(CH_2CH_2NH_2\}_2Cu(\mu\text{-}Cl)OSO_2CH_3]_2$ (**12**). The ^1H and ^{13}C NMR spectra of the new compounds as well as the single crystal X-ray structure analyses of **9a**, **11**, and **12** are reported and discussed.

Key words: Tetraazacyclododecane, Octaazacyclotetracosane, Copper Complex