

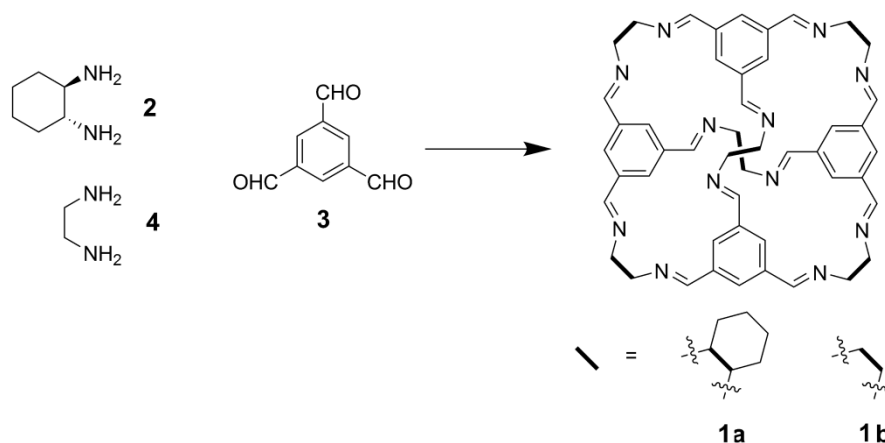
## Factors affecting self-assembly of a covalent organic cage

*Paweł Skowronek, Beata Warzajtis, Urszula Rychlewska and Jacek Gawroński*

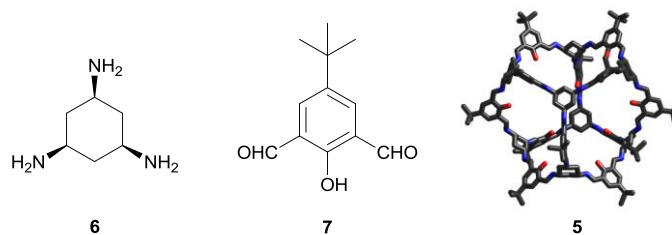
*Department of Chemistry, Adam Mickiewicz University, Poznań, Poland*

*Pawel.Skowronek@amu.edu.pl*

Syntheses of highly symmetrical large size covalent organic cages raised a question what is a driving force of their formation. We have reported spontaneous formation of cage molecule (**1**) in reaction of (*R,R*)-1,2 –diaminocyclohexane (**2**) and 1,3,5-triformylbenzene (**3**) in quantitative yield.<sup>1</sup> Although this reaction was template-free no other products were detected by NMR of the crude material. A rare *T* symmetry structure of **1a** was confirmed by X-ray analysis.<sup>2,3</sup> Similar cage was synthesized in 94% yield using conformationally labile 1,2-diaminoethane (**4**).<sup>4</sup>



Recently we have synthesized of an exceptionally large cage molecule (**5**) from *cis,cis*-1,3,5-triaminocyclohexane (**6**) and 4-*tert*-butyl-2,6-diformylphenol (**7**) in quantitative yield.<sup>4</sup> The main factors which seems to leads to the synthesis of those molecules as the only one product seems to be stereochemical factors and entropy of symmetry.



1. P. Skowronek, J. Gawroński, *Org. Lett.* 2008, **10**, 4755.
2. T. Tozawa, J.T.A. Jones, S.I. Swamy, S. Jiang, D.J. Adams, S. Shakespeare, R. Clowes, D. Bradshaw, T. Hasell, S.Y. Chong, C. Tang, S. Thompson, J. Parker, A. Trewin, J. Bacsá, A.M.Z. Slawin, A. Steiner, A.I. Cooper, *Nature Mater.*, 2009, **8**, 973.
3. T. Hasell, X. Wu, J.T.A. Jones, J. Bacsá, A. Steiner, T. Mitra, A. Trewin, D.J. Adams, A.I. Cooper, *Nature Chem.*, 2010, **2**, 750.
4. D.P. Lydon, N.L. Campbell, D.J. Adams, A.I. Cooper, *Synth. Commun.*, 2011, **41**, 2146.
5. P. Skowronek, B. Warzajtis, U. Rychlewska, J. Gawronski, *Chem. Commun.*, 2013, **49**, 2524.