



HAL
open science

Cyclic N-substituted aminomethyl benzamide oligomers: from shape-persistent macrocycle to molecular cage

Ayman Akhdar, Lionel Nauton, Claude Taillefumier, Thomas Hjelmgaard,
Arnaud Gautier, Sophie Faure

► To cite this version:

Ayman Akhdar, Lionel Nauton, Claude Taillefumier, Thomas Hjelmgaard, Arnaud Gautier, et al.. Cyclic N-substituted aminomethyl benzamide oligomers: from shape-persistent macrocycle to molecular cage. Munich 2023 Symposium on Foldamers, Sep 2023, Munchen, Germany. hal-04251954

HAL Id: hal-04251954

<https://uca.hal.science/hal-04251954v1>

Submitted on 20 Oct 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Cyclic *N*-substituted aminomethyl benzamide oligomers: from shape-persistent macrocycle to molecular cage

Ayman Akhdar,^a Lionel Nauton,^a Claude Taillefumier,^a Thomas Hjelmgaard,^b Arnaud Gautier,^a
 Sophie Faure^a

^a Université Clermont Auvergne, CNRS, ICCF, F-63000 Clermont–Ferrand, France, ^b Department of Chemistry, Section for Chemical Biology and Nanobioscience, Faculty of Science, University of Copenhagen, Thorvaldsensvej 40, 1871 Frederiksberg C, Denmark
sophie.faure@uca.fr

Arylopeptoids – i.e. *N*-alkylated aminomethyl-benzamide oligomers – is a class of peptoid-inspired oligoamides with an aromatic backbone.^[1] By contrast with most aromatic foldamers, these *N*-alkylated aromatic oligoamides do not capitalize on intramolecular hydrogen-bonding networks to stabilize their tri-dimensional structures and their conformational preferences are partly governed by the *cis/trans* isomerism of the backbone *N,N*-disubstituted amides. Previous studies on the foldameric properties of linear arylopeptoids have shown that well-defined conformations are only formed under limited circumstances. This backbone flexibility may, however, be turned into an advantage since it facilitates efficient head-to-tail macrocyclization, whereby constructs with well-defined structures may be formed. The tunability of *ortho*-, *meta*- and *para*-arylopeptoids was exploited to access a large panel of topologically diverse shape-persistent macrocycles.^[2] From these well-defined macrocycles, a double CuAAC reaction, using a copper-*N*-heterocyclic carbene as stable source of Cu (I),^[3] was exploited to access cage-like bis-triazolium structures with high level of organization. A preliminary study revealed the potential of these novel bis-triazolium cages for oxoanion recognition.^[4]

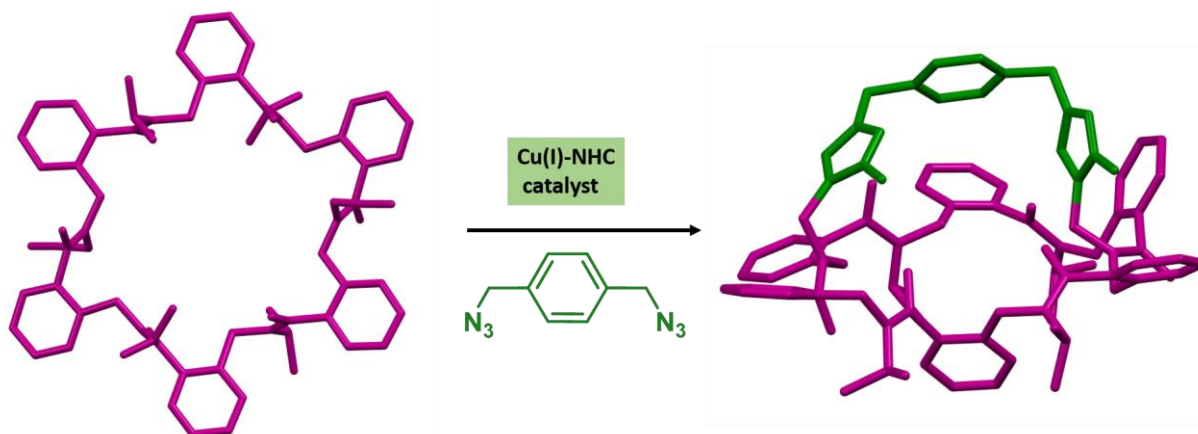


Figure 1. Cage-like bis-triazolium structure from *ortho*-arylopeptoid macrocycle via CuAAC

References

- [1] A. Akhdar, A. Gautier, T. Hjelmgaard, S. Faure *Chempluschem*. **2021**, *86*, 298-312.
- [2] (a) T. Hjelmgaard, O. Roy, L. Nauton, M. El-Ghozzi, D. Avignant, C. Didierjean, C. Taillefumier, S. Faure *Chem. Commun.* **2014**, *50*, 3564-3567 ; (b) T. Hjelmgaard, L. Nauton, F. De Riccardis, L. Jouffret, S. Faure *Org. Lett.*, **2018**, *20*, 268-271.
- [3] A. Akhdar, S. Faure, A. Gautier *Org. Biomol. Chem.* **2022**, *20*, 2402-2406.
- [4] *Unpublished results*