



Swiss Science Concentrates

A CHIMIA Column

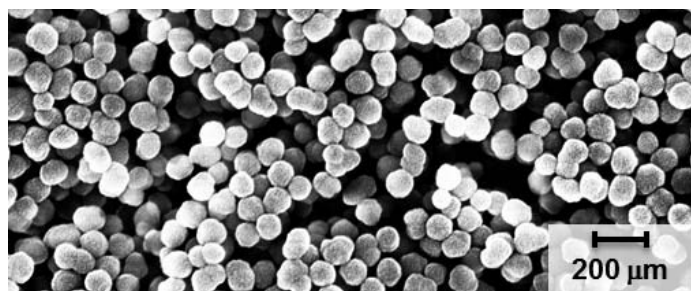
Short Abstracts of Interesting Recent Publications of Swiss Origin

Cell Transfection Using Layer-by-layer (LBL) Coated Calixarene-based Colloid Lipid Nanoparticles (SLNs)

L. Nault, A. Cumbo, R. F. Pretôt, M. A. Sciotti, and P. Shahgal-dian*, *Chem. Commun.* **2010**, 46, 5581

University of Applied Science Northwestern Switzerland, Muttenz

The future successes of gene therapy are intimately linked to the development of carrier systems able to efficiently transport nucleic acids across the cell membrane. In this work, the authors show that polycationic calixarene-based solid nanoparticles can be loaded at their surface with relevant amounts of DNA and chitosan *via* a layer-by-layer assembly process. The system is able to cross the cell membrane of mammalian cells and causes no relevant changes in the viability of the cells.



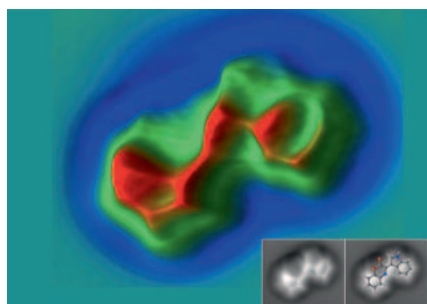
Scanning electron micrograph of calixarene-based SLNs

Organic Structure Determination Using Atomic-resolution Scanning Probe Microscopy

L. Gross*, F. Mohn, N. Moll, G. Meyer, R. Ebel, W. M. Abdel-Mageed, and M. Jaspars, *Nature Chem.* **2010**, 2, 821.

IBM-Research-Zurich (CH), Marine Discovery Centre, University of Aberdeen (UK), Department of Pharmacognosy, Assiut University (EG)

Resolving molecular structures with atomic precision has been a major goal of surface microscopy. In this contribution, the authors report on the direct imaging with atomic resolution of an organic compound, cephalondole A. This milestone demonstrates that scanning probe microscopy may soon complement traditional spectroscopic techniques for complex and ambiguous structural assignments.

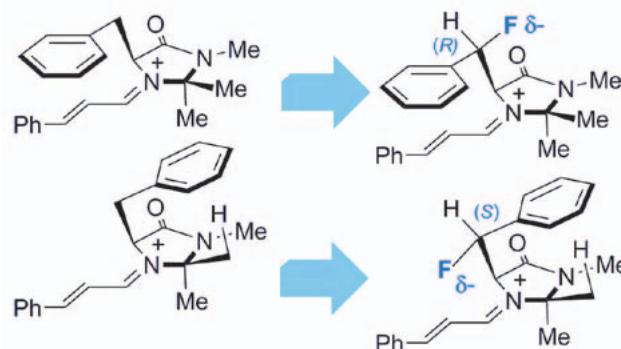


Fluoro-Organocatalysis: Conformer Equivalents as a Tool for Mechanistic Studies

C. Sparr and R. Gilmour*, *Angew. Chem. Int. Ed.* **2010**, 49, 6520
ETH Zürich

The concept of conformer equivalents as a tool to investigate noncovalent interactions in catalysis is disclosed. Specifically, the fluorine–iminium ion *gauche* effect has been exploited in the design of conformational probes for organocatalysis. Stabilizing hyperconjugative [$\sigma_{C-H} \rightarrow \sigma_{C-F}^*$] and/or electrostatic [$N^+ \cdots F^{\delta-}$] interactions render the C–F bond an excellent steering group for controlling molecular topology without introducing additional steric constraints. These studies provide a preliminary insight into some of the noncovalent interactions that are important for further catalyst development.

Iminium Ion Conformer \Rightarrow Conformer "Equivalent"

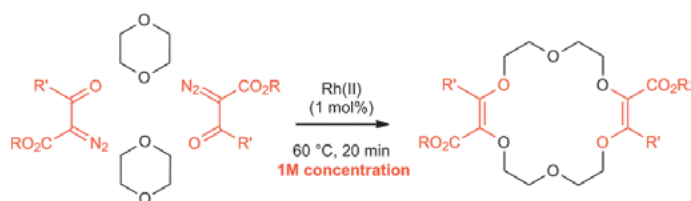


Rhodium(II)-Catalyzed One-Pot Four-Component Synthesis of Functionalized Polyether Macrocycles at High Concentration

W. Zeghida, C. Besnard, and J. Lacour*, *Angew. Chem. Int. Ed.* **2010**, 49, 7253.

University of Geneva

The authors report on the highly regio- and stereoselective synthesis of macrocyclic polyethers under non-templated conditions through the decomposition of diazo compounds in cyclic ethers such as dioxane or THF at high concentrations ($\geq 1M$). The 'intermolecular' reaction involving overall two solvent molecules and two molecules α -diazo- β -ketoester can effectively compete also for substrates that are known to undergo preferentially intramolecular cyclization in different solvents.



Prepared by N. Bruns, V. Köhler, R. Kramer, P. Mauleón, F. Monnard and T. R. Ward

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