



Swiss Science Concentrates

A CHIMIA Column

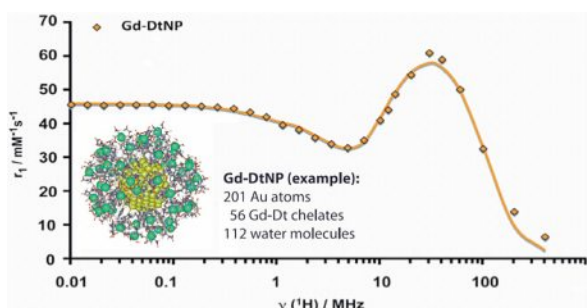
Short Abstracts of Interesting Recent Publications of Swiss Origin

Gold Nanoparticles Functionalized with Gadolinium Chelates as High-Relaxivity MRI Contrast Agents

L. Morrigi, C. Cannizo, E. Dumas, C.R. Mayer, A. Ulianov, and L. Helm* *J. Am. Chem. Soc.*, **2009**, *131*, 10828

EPF Lausanne, Université de Versailles, and University of Lausanne

The authors described water-dispersible gold nanoparticles functionalized with paramagnetic gadolinium(III) ions. Characterization using TEM images and dynamic light scattering indicate a particle size from 2 to 15 nm. NMRD profiles show relaxivities (per gadolinium) up to 100 MHz and maximum relaxation enhancement (per particle) of $\sim 3000 \text{ s}^{-1} \text{ mM}^{-1}$. The gold cores of the nanoparticles do not contribute significantly to the overall magnetic moment.

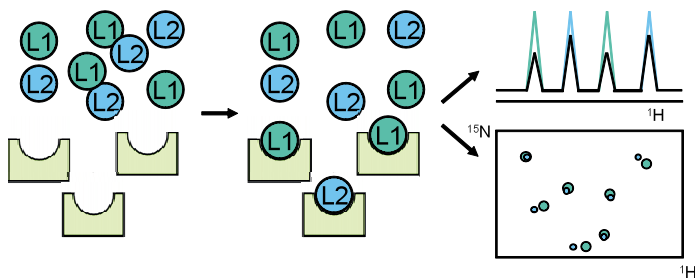


Ranking of High-Affinity Ligands by NMR Spectroscopy

X. Zhang, A. Sanger, R. Hemmig, and W. Jahnke* *Angew. Chem., Int. Ed.* **2009**, *48*, 6691

Novartis Institute for Biomedical Research, Basel

In this article the authors present a precise NMR spectroscopic method for the determination of relative binding affinities of ligands to protein receptors by the differential selection of a preferred ligand by the protein. For the first time, NMR spectroscopy can be used for the determination of affinities of tightly binding ligands. This approach is a valuable tool for the lead-optimization process.

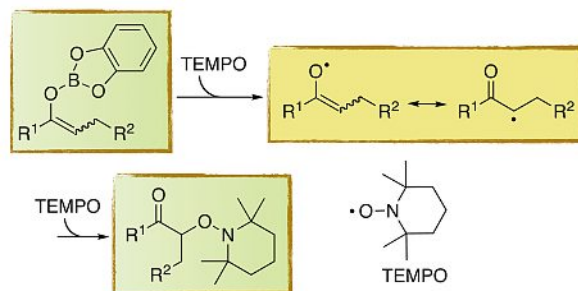


Oxidation of Catecholboron Enolates with TEMPO

M. Pouliot, P. Renaud*, K. Schenk, A. Studer*, and T. Vogler, *Angew. Chem., Int. Ed.* **2009**, *48*, 6037

University of Bern, EPFL, and Westfalische Wilhelms-University, Munster

In this article, the authors describe a general method to oxidize catecholboron ketone enolates under mild conditions using the persistent TEMPO radical. Catecholboron enolates can be prepared either by 1,4-reduction of α,β -unsaturated ketones or by transmetalation of silyl enol ethers and zinc enolates starting from chlorocatecholboranes. Formation of the enolate and its oxidation by TEMPO can be performed as a one-pot process with high regio- and stereoselectivity.



Rational Monomer Design towards 2D Polymers: Synthesis of a Macrocycle with Three 1,8-Anthrylene Units

P. Kissel, A.D. Schluter,* and J. Sakamoto*, *Chem. Eur. J.* **2009**, *15*, 8955

ETH Zurich

One-monomer-unit thick, laterally infinite unimolecular networks with a translational periodicity are referred to as 2D polymers. A macrocycle with three 1,8-anthrylene units has been devised as potential monomer. The synthesis was achieved by using Pd-catalyzed cross-coupling reactions, in which a copper-free Sonogashira reaction was the key to the final cyclization. Photochemical model reactions suggest that the macrocycle has the potential to undergo photo-induced [4+4] cycloaddition without undesired side reactions, which is of relevance for the ultimate goal of creating 2D polymers.

