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Swiss Science Concentrates

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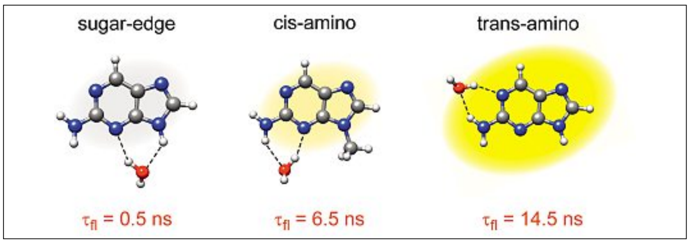
Short Abstracts of Interesting Recent Publications of Swiss Origin

Switching on the Fluorescence of 2-Aminopurine by Site-selective Microhydration

S. Lobsiger, S. Blaser, R. K. Sinha, H.-M. Frey, and S. Leutwyler*, *Nature Chem.* **2014**, *6,* 989. University of Bern

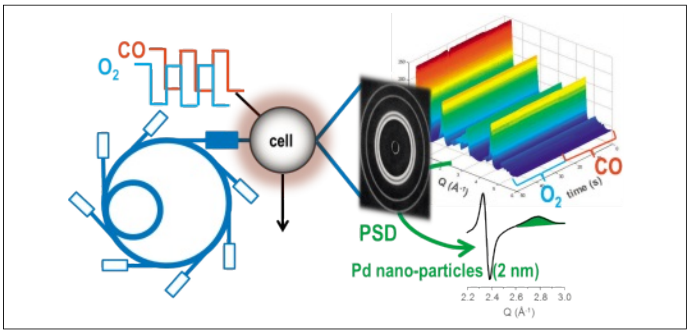
2-Aminopurine (2AP) is widely used as a site-specific fluorescent probe of DNA and RNA base-flipping and -folding. The group of S. Leutwyler showed that 2AP is not intrinsically strongly fluorescent, contrary to widespread belief. Gas-phase, jet-cooled 2AP and 9-methyl-2AP have very short fluorescence lifetimes (156 ps and 210 ps, respectively) rendering them essentially non-fluorescent. However, the lifetime of 2AP increases dramatically when it is part of a hydrate cluster, $2AP\cdot(H_2O)_n$, where n = 1–3. Selective microhydration of 2AP at its sugar-edge, *cis*-amino or *trans*-amino sites increases the fluorescence lifetime by up to 100-fold.



Revealing the Dynamic Structure of Complex Solid Catalysts using Modulated Excitation X-ray Diffraction

D. Ferri*, M. A. Newton*, M. Di Michiel*, G.L. Chiarello, S. Yoon, Y. Lu, and J. Andrieux, *Angew. Chem Int. Ed.* **2014**, *53*, 8890. Paul Scherrer Institut, Villigen

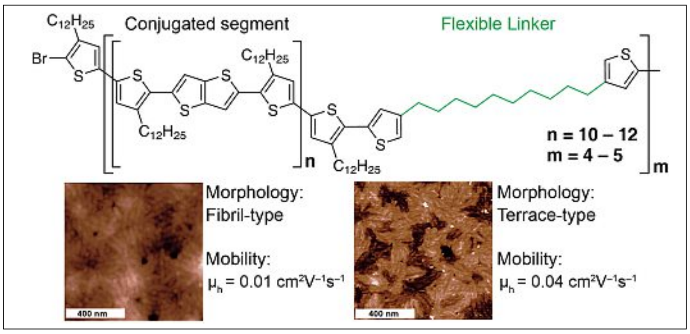
X-ray diffraction is a valuable tool to unravel the structure of solid catalysts under operation conditions. However, it is typically limited in the case of finely dispersed systems. A modulation excitation approach coupled to phase sensitive detection has been used to capture small Pd nano-particles of *ca.* 1–2 nm (2 wt%) supported on ceria-zirconia under an oscillating CO-O_2 feed. By eliminating the contribution of the static response of the ceria-zirconia bulk, this approach evidences very subtle changes that are associated with the Pd(111) reflection and the Ce^{3+}/Ce^{4+} pair. The redox kinetics of the full material can, thus, be described in greater detail.



Controlling Conjugated Polymer Morphology and Charge Carrier Transport with a Flexible-linker Approach

A. Gasperini, S. Bivaud, and K. Sivula*, *Chem. Sci.* **2014**, *5,* 4992. EPFL Lausanne

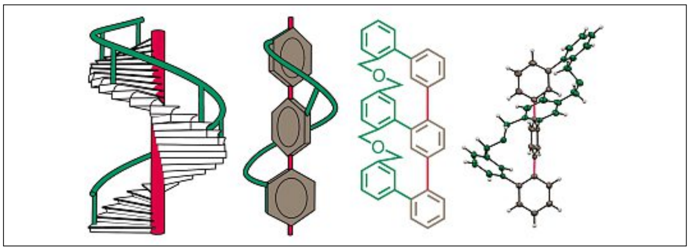
The prototype of a new class of polymer semiconductors was presented by K. Sivula and coworkers. The conjugation segment length and the length of the entire polymer chain were separately controlled by using a double Stille-coupling polymerization. Polymers of the same molecular weight were shown to exhibit distinct thin-film morphologies and resulted in an improvement of the charge carrier mobility from fibril-type to terrace morphologies. The results indicate that employing linkers is a promising route to advance morphology control in semiconducting polymer based devices.



Inducing Axial Chirality in a 'Geländer' Oligomer by Length Mismatch of the Oligomer Strands

M. Rickhaus, L.M. Bannwart, M. Neuburger, H. Gsellinger, K. Zimmermann, D. Häussinger, and M. Mayor*, *Angew. Chem Int. Ed.* **2014**, *53,* 14587. University of Basel and Karlsruhe Institute of Technology

A new concept how to introduce axial chirality was presented by the group of M. Mayor. Their Geländer-type oligomer interlinks three terphenyl rings with an oligo(benzyl ether) as a single bridge. The induced length mismatch of the oligomers is compensated by twisting the longer strand around the shorter resulting in a continuous twist of the entire structure. As a result, the molecule exists exclusively in the form of two stereoisomers, a pair of enantiomers – for the first time such a system cannot adopt an achiral *meso* form. A high racemization barrier allowed the chiral separation of both enantiomers, which undergo subsequent uniform interconversion over the course of several hours.



Prepared by Caroline D. Bösch, Markus Probst, Yuliia Vyborna, Mykhailo Vybornyi, Simon M. Langenegger and Robert Häner*

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