doi:10.2533/chimia.2011.977

# Swiss Science Concentrates

## A CHIMIA Column

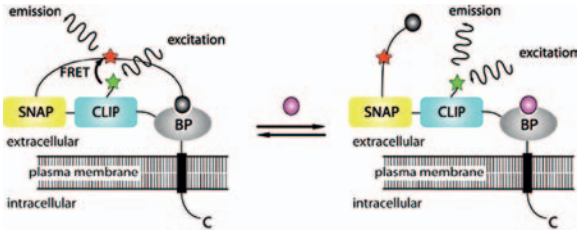
Short Abstracts of Interesting Recent Publications of Swiss Origin

### Semisynthesis of Fluorescent Metabolite Sensors on Cell Surfaces

M. A. Brun, R. Griss, L. Reymond, K.-T. Tan, J. Piguet, R. J. R. W. Peters, H. Vogel, and K. Johnsson*, *J. Am. Chem. Soc.* **2011**, *133*, 16235.

EPFL

Advancing the understanding of signal transduction and metabolic pathways *in vivo* requires the development of sensors with high temporal and spatial resolution. For this purpose a new class of sensors, so-called Snifits (SNAP-tag based indicator proteins with a fluorescent intramolecular tether), was developed. Snifits are composed of a metabolite binding protein (BP) as well as two units (SNAP and CLIP) for posttranslational orthogonal chemical modification. One of these carries a dye as well as a ligand for the sensor protein. The other incorporates a complementary dye to enable Förster resonance energy transfer (FRET). Efficient FRET takes place only when the intramolecular ligand is bound to the sensor protein and is not displaced by the external target ligand (the metabolite). Snifits were expressed and assembled on mammalian cells and displayed excellent sensitivities.

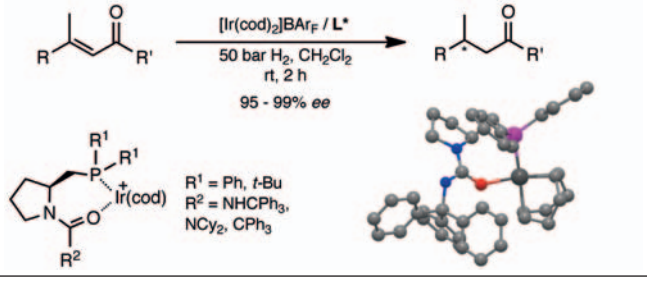



### Proline-Based P,O Ligand/Iridium Complexes as Highly Selective Catalysts: Asymmetric Hydrogenation of Trisubstituted Alkenes

D. Rageot, D. H. Woodmansee, B. Pugin, and A. Pfaltz*, A*ngew. Chem. Int. Ed.* **2011**, *50*, 9598.

University of Basel and Solvias

Traditionally, the best ligands for enantioselective hydrogenation with precious metals have relied on soft donors (*e.g.* P, N, carbene *etc.*). Herein, the authors present proline-derived P,O-ligands which bind to iridium *via* a urea- or amide oxygen as well as a phosphine. A broad automated screening effort led to the identification of highly efficient hydrogenation catalysts for the reduction of trisubstituted alkenes, most notably with α,β-unsaturated carboxylic esters and ketones. These P,O ligands match or surpass the performance of the best P,N- and P,C-ligands.

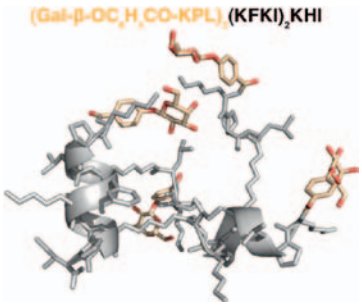



### A Glycopeptide Dendrimer Inhibitor of the Galactose-Specific Lectin LecA and of *Pseudomonas aeruginosa* Biofilms

R. U. Kadam, M. Bergmann, M. Hurley, D. Garg, M. Cacciarini, M. A. Swiderska, C. Nativi, M. Sattler, A. R. Smyth, P. Williams, M. Cámara, A. Stocker, T. Darbre, and J.-L. Reymond*, *Angew. Chem. Int. Ed.* **2011**, *50*, 10631.

University of Bern

The spread of antibiotic-resistant bacteria is one of the most pressing problems in human health today. In this context, the formation of biofilms plays an important role in antibiotic resistance and disease progression. The authors report the inhibition of a *P. aeruginosa* biofilm formation with a multivalent ligand targeting the galactose-specific lectin LecA. For this purpose a β-phenylgalactosyl decorated peptide dendrimer was developed. The multivalency and structure of the dendrimer was critical for inhibition of the biofilm. Optimization of the dendrimer sequence and synthesis of analogues with higher multivalency may further improve the biofilm inhibition activity of these promising compounds.

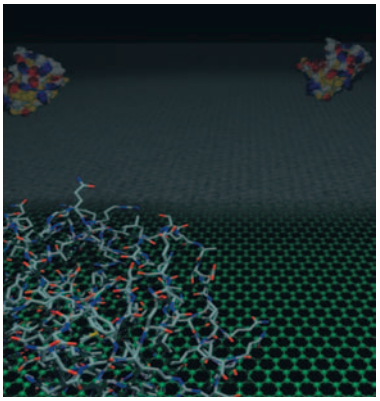



### Oxidative Doping Renders Graphene Hydrophilic, Facilitating Its Use As a Support in Biological TEM

R. S. Pantelic*, J. W. Suk, Y. Hao, R. S. Ruoff*, and H. Stahlberg*, *Nano Lett.* **2011**, *11*, 4319.

University of Basel and University of Texas, Austin (USA)

Transmission electron microscopy (TEM) is widely used to image proteins. Due to the low contrast of biomolecules, staining across amorphous carbon supports or the use of sophisticated cryo-TEM techniques is necessary. Graphene represents an ideal support for TEM, as it is electron transparent and electrically conductive (by which sample charging may also be reduced). However, pristine graphene is hydrophobic. This hampers the direct adsorption of biological samples to the support. The authors have annealed graphene under oxidative conditions and produced hydrophilic graphene TEM supports with minimal degradation of the Graphene structure. The manuscript demonstrates the imaging of vitrified, unstained tobacco mosaic virus (TMV) with significantly increased contrast compared to conventional thin amorphous carbon supports.



Prepared by N. Bruns, A. Ganic, V. Köhler, R. Kramer, F. Monnard, and T. R. Ward

**Do you want your article to appear in this SWISS SCIENCE CONCENTRATES highlight?**
Please contact thomas.ward@unibas.ch