



Gerard Roelfes is awarded a Vici grant



The Netherlands Organisation for Scientific Research (NWO) has awarded a VICI grant to Gerard Roelfes, associate professor in the Stratingh Institute for Chemistry. In his project, entitled "Artificial Metalloenzymes: augmenting biological synthesis with chemical versatility", he will focus on the development of new artificial metalloenzymes, which are hybrids between chemical and biological catalysts, and their application in living cells. The ultimate goal of this project is expanding the repertoire of biological synthesis with unnatural reactions, which will lead to a more sustainable approach to chemistry.

As one of the first, Gerard Roelfes has now been awarded all the grants in the innovational research scheme (veni, vidi & vici).

Edwin Otten is elected teacher of the year 2013 for the Faculty of Science

On December 19 the chemistry students organized the annual 'Teacher of the Year' election. This year's winner is Edwin Otten, who was nominated for his lectures on Inorganic Chemistry and Organometallic Chemistry. During the event the three nominees (Wesley Browne, Francesco Picchioni and Edwin Otten) each gave a brief presentation to convince the audience of their ability, concluded by a ballot vote. During the drinks that followed Edwin was announced as the winner of the Teacher of the Year award.



100 promoties for Ben Feringa



On 13th December 2013, Apparao Draksharapu Ben Feringa 100th PhD student and Wesley Browne's 1st defended his thesis "Shedding light on active species in Fe, Ni and Cu catalysis : photochemical, spectroscopic and electrochemical studies".

This unique achievement was covered by the news both at University and regional level. The university is proud to see one of its leading professors reach this prestigious milestone.

Photo by Jeffrey Bos.



Giovanni Bottari is awarded a Marie Curie Intra-European Fellowship

Giovanni Bottari has recently been awarded a Marie Curie Intra-European Fellowship that will allow him to conduct research on the asymmetric hydrogenation of unsaturated substrates with cheap and sustainable iron-based chiral complexes, under the supervision of Prof. Feringa. Giovanni studied chemistry at the University of Messina, where he defended his PhD thesis on asymmetric catalysis under the guidance of Prof. Felice Faraone. After 3-years postdoctoral experience in Seville (Instituto de Investigaciones Químicas, CSIC) in the research groups of Dr. Antonio Pizzano and Dr. Margarita Paneque, focusing on asymmetric hydrogenation and reaction mechanisms in organometallic chemistry, respectively, he joined the group of Dr. Barta at the

University of Groningen with a project on the conversion of biomass and biomass-derived platform chemicals to liquid fuels.

Highlights by Prof. dr. Jan B.F.N.Engberts

I like to start the 2014 February issue of the highlights by sending my best wishes to my readers for a healthy, happy and creative New Year!

- In PNAS appeared an interesting profile of the 2013 Nobel laureates in chemistry, written by Alan Fersht of the University of Cambridge, UK. It is a brief personal account of the careers of Karplus, Levitt, and Warshel, and the lessons he learned from their great accomplishments. His message is that scientists should be allowed to be scientifically independent when they are young and not wait until they are in their 30s and 40s for their first independent grants. The 2013 laureates deserved their honor just for their earlier work and, indeed, the prize is clearly a triumph for youth! *A.R. Fersht, Proc.Natl.Acad.Sci. USA 2013,110,19656-19657.*
- Recent measurements performed by chemists from Universities at Shanghai and Minneapolis demonstrated that cyclopropene is quite a curious compound. They found that the C-H bond dissociation energies were similar for cyclopropane and the vinyl position of cyclopropene. It is suggested that this remarkable situation is a consequence of the ring strain in the cyclopropene. *Z. Tian, L. Lis, S.r. Kass, J.Org.Chem. 2013, DOI 10.1021/jo402263v.*
- Quinaldopeptin (QP) belongs to a class of C₂-symmetric cyclic decapeptides which exhibit a variety of promising biological properties such as antitumor, antibacterial, and antiviral activities. Some information is available about the mechanism of their activities. QP has a strong activity against, among others, melanoma B16. The first total synthesis has now been carried out by scientists from Hokkaido University, Sapporo, Japan. Solid-phase peptide synthesis was employed and also some analogues were synthesized in reasonable to good yields. Synthetic QP showed a strong cytotoxicity against a range of human cancer cell lines. *S. Ichikawa, T. Okamura, A. Matsuda, J.Org.Chem.2013,78,12662-12670.*
- The ability to repair mechanical or chemical damage is a survival feature in most living creatures. Scientists from China and the USA have now successfully demonstrated self-healing chemistry in batteries. The lifetime of high-capacity electrodes of rechargeable batteries, such as silicon anodes, is shortened by mechanical fractures during the cycling process.

Short cycle-life can now be overcome by applying self-healing chemistry to silicon microparticle anodes. This is made possible by coating with a self-healing polymer. While retaining a high capacity, the cycle life can be ten times increased. Cracks and damage in the coating during cycling can be spontaneously healed by the randomly branched hydrogen-bonding polymer. *C. Wang, H. Wu, Z. Chen, M.T. McDowell, Y. Cui, Z. Bao, Nature Chem. 2013,5,1042-1048.*

- There is an exciting development in the field of dynamical biology. Scientists at CalTech, Pasadena, USA have integrated the fourth dimension, time, into 3D cryo-electron microscopy of proteins. The 4D cryo-EM now enables the detection of picometer-scale movements that take place in hydrated proteins on a nanosecond time scale. The novel technique paves the way for ultrafast structural dynamics studies of 2D membrane protein crystals and 3D micro- or nanocrystals embedded in vitreous ice. Many applications of 4D cryo-EM are anticipated in the future. *A.W.P. Fitzpatrick, U.J. Lorenz, G.M. Vanacore, A.H. Zewail, J.Am.Chem.Soc.2013, DOI 10.1021/ja41150551.*
- Synthetic organic chemists from the National Taiwan University have developed an efficient method for the enantioselective synthesis of highly functionalized decaline systems containing seven contiguous stereogenic centers with enantioselectivities higher than 99%. It involves a one-pot methodology with Michael-Michael-Michael-Aldol reactions and merging of organocatalysis with photoredox catalysis. The structure and absolute configuration of an appropriate product were confirmed by X-ray analysis. *B-C. Hong, C-W. Lin, W-K. Liao, G-H. Lee, Org.Lett.2014, DOI 10.1021/ol403113c.*
- A family of four-component supramolecular nanorotors has been prepared by Schmittel and coworker at the University of Siegen, Germany. The nanorotors rotate in a stochastic oscillating manner about a dynamic hinge, resembling closely that in a rotary sprinkler. Kinetic and thermodynamic data show that the spinning motion occurs by an intrasupramolecular pathway (>99.9%). Addition and removal of metal ions allows reversible regulation of the speed of the nanorotors and their mode of rotation. It is suggested that the self-assembly protocol constitutes an important step toward constructing fully operational machines through simply mixing dissimilar molecular components. *S.K. Samanta, M. Schmittel, J.Am.Chem.Soc.2013,135,18794-18797.*
- An interesting review, written by scientists from a Chinese and an American University (Beijing and Tempe, Arizona), highlights recent advances in the preparation, characterization, and catalytic performance of single-atom catalysts (SACs). The paper is focused on single atoms anchored to metal oxides, metal surfaces, and graphene. There is an increased understanding of the spatial arrangements and electronic properties of single atoms, as well as their interactions with the support. SAC can be employed for, among others, oxidation, water gas shift, and hydrogenation. Single metal atoms on support can allow the tuning and the optimization of active sites as well as the activity, selectivity, and stability of heterogeneous catalysts. *X-F. Yang, A. Wang, B. Qiao, J. Li, J. Liu, T. Zhang, Acc.Chem.Res.2013,46,1740-1748.*
- An important question in molecular recognition has been addressed by scientists from the University of Edinburgh. How strongly contribute van der Waals (vdW) dispersion forces to interactions between apolar alkyl chains? Using synthetic molecular balances, the interactions have been measured in 31 organic, fluoruous and aqueous solvent environments. It was found that the vdW forces were an order of magnitude smaller than previously believed. Instead, it appears that cohesive solvent-solvent interactions are the major driving force behind apolar association in solution. These novel and far-reaching ideas were further discussed by Shimizu. *L. Yang, C. Adam, G.S. Nichol, S.L. Cockroft, Nature Chem. 2013,5,1006-1010. K.D. Shimizu, Nature Chem.2013,5,989-990.*

- The final paper I like to mention is very exceptional. It is entitled “Laughing Matter” and published in Nature Chemistry. Michelle Franci (Bryn Mawr College, USA) asks the question whether we should indulge in scientific humor. It is argued that a keen sense of humor is an essential survival trait for a scientist, human or not (!). Science humor is a secret handshake, a way to stake an identity claim as a scientist. Of course there is the risk that funny will be mistaken for frivolous, particularly in formal written work. But, frivolity aside, both science and humor tickle the mind. The author ends by saying “chemistry is laughing matter – the universe’s joke on chemists.....”

Why did the bear dissolve in water?

It was a polar bear!

M. Franci, Nature Chem. 2014, 6,1-2.

Jan Engberts

Stratingh Seminars

Thursday, February 13th

Prof. Carsten Schmuck, University of Duisburg-Essen

Room: 5111.0022

Time: 16:00 hrs

Title: Fascination supramolecular chemistry: from the recognition of biomolecules to switchable nanoassemblies

PhD Defences

Friday, February 7th

@ **11:00 Davide Fracasso** will defend his PhD thesis. **Title:** “Charge Transport through Self-Assembled Monolayers with Eutectic Gallium-Indium Top Contacts”. **Promotor:** Prof. dr. J.C. Hummelen, Dr. R.C. Chiechi.

Friday, February 14th

@ **12:45 Miriam Hanstein** will defend her PhD thesis. **Title:** “Asymmetric catalysis in the synthesis of *cis*-cyclopropyl containing fatty acids and the addition of Grignard reagents to carbonyl compounds”. **Promotores:** Prof. dr. A.J. Minnaard

@ **14:30 Julia Intermann** will defend her PhD thesis. **Title:** “Magnesium and Zinc Hydride Complexes—from fundamental investigations to potential applications in Hydrogen storage and catalysis”. **Promotores:** Prof dr. S. Harder

New appointments



16/1/2014—PostDoc

Arne Weber

Group Minnaard

Werkbespreking: Thursday morning 8.30 hrs, room 5111.0080

February 6th—G. Leonetti: “Solvent composition dictates emergence in a dynamic molecular network containing competing replicators”

February 13th—F. Mecozzi: Title to be announced **Will be held in Bernoulliborg 5161.0105**

February 20th—M. Jäger: Catalytic regioselective oxidation of carbohydrates—towards the origin of the selectivity

February 27th—M. Giannerini: Palladium Catalysed Cross-Coupling with Organolithium Reagents

March 6th—F. Caprioli: Title to be announced

If you have items for the next issue of this Newsletter, please send an e mail to the Stratingh Institute office: Stratingh@rug.nl