university of groningen

Newsletter

Stratingh Institute for Chemistry

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November 2016

Wesley Browne is awarded the KNCV teaching prize

Wesley Browne, professor and chair of the Department of Molecular Inorganic Chemistry at the University of Groningen, has won the KNCV Education Award in 2016. The prize was awarded on November 5 at the Chemistry Conference Woudschoten. KNCV education prize is awarded alternately each year to teachers in secondary education and vocational education (MBO and HBO) and university education. The price offers the opportunity to visit a congress of choice. According Fer Coenders, jury chairman of the Education Award, Browne has made an enormous contribution to the development and implementation of the chemistry curriculum in Groningen. Moreover Browne has excellent teaching qualities. He knows how to explain complex chemistry processes visually.

You can read more (in Dutch) about this prize by clicking here.

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

- A survival guide for PhD students working on interdisciplinary projects was recently published by Kun-Hsing Yu (Stanford University). He argues that mastering one field is hard, and that performing research in two dissimilar fields can be more than doubly stressful. But, on the other hand, interdisciplinary research can be highly rewarding because of the prospects of advancing science, sometimes in unexpected ways, and pushing forward one's professional career. Yu provides seven suggestions, with a brief discussion, for incoming graduate students: (1) Find a great advisor, (2) Know thyself, (3) Become a domain expert in both fields, (4) Build collaborations, (5) Think deeply about your career strategy, (6)Be open minded, (7)Take good care of yourself and try to select a healthy lifestyle. *Kun-Hsing, Y., Nature Biotechnology, 2016, 34, 993-994.*
- Sorensen and coworkers at Princeton University have developed a novel catalytic method for fluorination of unactivated C(sp3)-H bonds. Introducing C-F bonds in organic molecules has always been a challenge, but now it was re-

ported that employing a uranyl (UO_2^{2+})photo-redox catalyst and the electrophilic fluorinating reagent NFSI lead to positive results. Blue light can be used for the excitation of UO_2^{2+} to an electronic state capable of abstraction of a hydrogen atom fom simple alkanes. The yields are sometimes not yet high, but these findings are an important step forwards in the development of fluorination methods in pharmaceutical and material chemistry. The paper has been reviewed by Ritter and Neuman. *West, J.G., Bedell, T.A., Sorensen, E.J., Angew.Chem. Int.Ed., 2016, 55,8923-8927. Neuman, C.N., Ritter, T., Nature Chem. 2016, 8, 822-823.*

- Enthalpy - entropy as well as enthalpy of activation – entropy of activation compensation (EEC) effects have been investigated and discussed for more than 90 years. Many scientists have considered EEC as quite natural and often few attempts have been made to explain its thermodynamic rationality. Moulik and three colleagues from the University of Jadavpur (India) have written an extensive analysis and even suggested that sometimes the conventional EEC plot is not appropriate and mathematically sound. In the literature examples of non- and anti-compensation effects can be found. The authors have tried (1) to give a realistic account of the role of ΔG along with ΔH and ΔS in understanding EEC, and (2) to give a physico-chemical meaning of the EEC. *Pan, A., Kar, T., Rakshit, A.K., Moulik, S.P., J.Phys.Chem. 2016, DOI 10.1021/acs.jpcb.6b05890.*
- A communication in J.Am.Chem.Soc., written by Kempe and a coworker (Bayreuth University), reports the first base metal-catalyzed -alkylation of unactivated amides and esters by alcohols. The catalysts are cobalt complexes stabilized with pincer ligands (PN5P). The precatalysts are easily available on a multigram scale from commercially available starting materials and are self-activating under the basic reaction conditions. The same methodology, with mild reaction conditions and good functional group tolerance, can be employed for the preparation of ketones and for the conversion of alcohols into aldehydes elongated by two carbon atoms. *Deibl, N., Kempe, R., J.Am.Chem.Soc.,2016, DOI 10.1021/jacs.6b06448.*
- We all know that throwing a chunk of alkali metal into water leads to an explosion and fire. But now Pavel Jungwirth (Czeck Academy of Sciences) and three colleagues have shown, following up a previous study (Nature Chem. 2015,7,250-254), that gently placing a drop of a sodium/potassium alloy on water under an inert atmosphere just leads to floating of the metal alloy on water. There is a fast production of solvated electrons, and their blue color can be observed with the naked eye. Hydrogen and hydroxide are formed in an exoergic process and the alkali metal drop becomes glowing red. Part of the metal is even evaporated. The final result is a transparent drop of molten hydroxide, temporarily stabilized on water, but spectacularly bursting after sufficient cooling. The distinct stages of the reaction were characterized using high-speed camera imaging and various spectroscopic techniques. *Mason, P.E., Buttersack, T., Bauerecker, S., Jungwirth, P., Angew.Chem.Int.Ed., 2016, DOI 10.1002/anie.201605986.*
- "Click Chemistry" was introduced by Sharpless and coworkers in 2001 and has found broad applications. Chemical modules are linked together in high yields (near 100%) under mild conditions without prior derivatization and without byproducts that have to be removed from the reaction mixture. So far there have been no methods for facile "declicking". However, now Anslyn with six coworkers at the University of Texas, Austin, have developed a method to click together amines and thiols, followed by a chemically triggered declicking to release the undisturbed original amine and thiol components. This novel procedure has been used to modify proteins, to synthesize oligomers and create multi-

component libraries, which can all be declicked to give the original starting components. The work has been reviewed by Fulton, who suggests that organic chemists will be inspired by Anslyn's findings and that declicking chemistry might have considerable impact. *Diehl, K.L., Kolesnichenko, I.V., Robotham, S.A., Backman, J.L., Zhong, Y., Brodbelt, J.S., Anslyn, E.V., Nature Chem., 2016, 8, 968-973; Fulton, D.A., Nature Chem. 2016, 8, 899-900.*

- Nicolaou (Rice University, Houston) has published a nice brief review of the importance and development of synthetic organic chemistry. He argues that the profound impact of organic synthesis on science and society derives from its ability to bridge structure and function. Apart from purely scientific aspects, it can make important contributions to solving the global challenges of health, hunger, and the environment. The paper is worth reading because it explains convincingly how synthetic organic chemistry evolved and expanded in scope and reached new domains of molecular complexity and diversity, delivering molecular structures for all intents and purposes. *Nicolaou, K.C., Chem. 2016, 1, 331-334.*
- A rather unique environment for the investigation of isolated atoms and molecules is provided by the cavity inside fullerenes. Whitby at the University of Southampton, and sixteen coworkers from his own and three other Universities, used molecular surgery to put HF inside fullerene to give HF@C60, characterized by NMR spectroscopy. The data are indicative for an isolated molecule. It was found that the encapsulated HF moves freely inside the cage and, as shown by inelastic neutron scattering and IR spectroscopy, is exhibiting quantization of its translational and rotational degrees of freedom. A variety of other physical techniques was used for a study of the properties of the endohedral fullerene. The cage has a strong shielding effect, as indicated by the electric dipole moment of HF@C60 , which is only about 25% of that for isolated HF. *Krachmalnicoff, A., Bounds, R., Mamone, S., Alom, S., Concistre, M., Meier, B., Kouril, K., Light, M.E., Johnson, M.R., Rols, S., Horsewill, A.J., Shugai, A., Nagel, U., Room,T., Carravetta, M., Levitt, M.H., Whitby, R.J., Nature Chem., 2016, 8, 953-957.*
- Michelle Francl (Bryn Mawr College, USA and Vatican Observatory) attended a summer school where the topic was "Water in the Solar System". She asked the question "how old is the water in my cup of tea? " In a brief paper in Nature Chemistry, she has discussed the origins of water in the Universe. Calling water the Mickey Mouse of molecules, she tells us that there is an enormous cloud of water vapour around the quasar APM 08279+5255, which indicates that water has been present in the Universe for at least 12 billion years. However, there is strong evidence that the water in her cup of tea comes from protoplanetary factories, about 9.2 billion years ago, housed on the dust of dead stars. She concludes "Water: ever ancient, ever new!" *Francl, M., Nature Chem. 2016, 8, 897-898.*

Jan Engberts

From the Reaxys team:

The New Reaxys is now available for you to try. There have been significant changes made to improve your Reaxys search experience while continuing to deliver relevant answers.

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You'll continue to have parallel access until mid-2017, so there is plenty of time to discover the exciting possibilities that the new version uncovers. We will also be in touch regularly with specific details about the New Reaxys.

Yours sincerely

The Elsevier Reaxys Team

Stratingh Institute co-ordinating office

The Stratingh Office is located on the ground floor of building 16—Nijenborgh 4– and it consists of Hilda, Alphons and Cristina. We handle a range of responsabilities and provide help and advice on various aspect of University regulations.

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New Appointments

Anastasia Afanasenko

As of 1/10/2016

PhD student

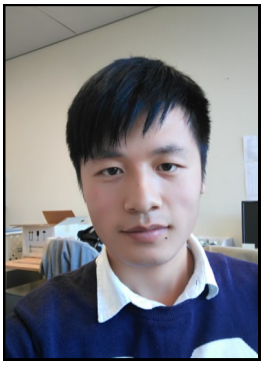
Group Harutyunyan

Reinder de Vries

As of 1/10/2016

PhD student

Group Roelfes



Yafei Guo

As of 1/10/2016

PhD student

Group Harutyunyan

Beibei Guo

As of 1/10/2016

PhD student

Group Otten

Anirban Mondal

As of 1/10/2016

PhD student

Group Feringa

Marco Wonink

As of 1/10/2016

PhD student

Group Feringa

Edwin Otten

As of 1/10/2016

Associate Professor

Sijbren Otto

As of 1/7/2016

Full Professor

PhD Defences

Friday, November 18th

@ 11:00 Matea Vlatkovic will defend her PhD thesis. Title: “Dynamic control of chiral space”. Promotor: Prof. dr. B.L. Feringa

Friday November 25th

@ 11:00 Peter Dijkstra will defend his PhD thesis. Title: “Shining light on radiation detection and energy transfer—Triazole ligands used for detection of radiation and lanthanide binding”. Promotores: Prof. dr. W.R. Browne and Prof. dr. H.J.Wörtche

@ 14:30 Anne Schoonen will defend her PhD thesis. Title: “The origin and amplification of chirality”. Promotor: Prof. dr. B.L. Feringa

Friday, December 2nd

@ 9:00 Leticia Monjas Gómez will defend her PhD thesis. Title: “Structure-based design of li-

gands for vitamin transporters in bacteria". Promotores: Prof. dr. A.K.H. Hirsch and Prof. dr. A.J. Minnaard

@ 11:00 Davide Angelone will defend his PhD thesis. Title: "Elucidation of mechanisms in manganese and iron based oxidation catalysis—Mechanistic insights and development of novel approaches applied to transition metal catalyzed oxidations catalysis". Promotor: Prof. dr. W.R. Browne

Friday, December 9th

@ **12:45 Giulia Leonetti** will defend her PhD thesis. Title: "Control over the emergence of self-replicators in dynamic molecular networks". Promotor: Prof. dr. S. Otto

Werkbespreking: Thursday morning 8.30 hrs, room 5111.0080

November 17th—Zhuohua Sun (PhD Barta) "Cu doped porous metal oxides as versatile catalysts for synthesis of benzimidazoles and lignocellulose conversion"

November 24th- Ruben Maaskant (PhD Roelfes) "Bioorthogonal modification of dehydroamino acids"

December 1st—Jinling Cheng (PhD Feringa) Title to be announced - Topic: "Molecular photoswitches"

December 8th— Gang Ye (PhD Chiechi) Title to be announced - Topic: "Synthesis and characterization of conjugated polyions"

December 15th— Tom van Leeuwen (PhD Feringa) Title to be announced - Topic: "Molecular motors"

The traditional Stratingh Christmas Borrel will take place on Friday December 16th, from 16:00 in room 5116.0215.

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