



European Polysaccharide
Network Of Excellence

N°15 - MAY 2010



***“Nature makes polysaccharides,
EPNOE turns them into products”***

editorial

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To organise collaborations between the 16 academic/research members of EPNOE and the 24 industrial members is a challenge.

Despite the awareness of the many benefits that are bringing such collaborations, there are many obstacles that need to be overcome in order to be successful: fear that ideas might be used by others, management of intellectual and property rights, difficulties in organising discussions and brain-storming, finding the ways to finance R&D, etc...

EPNOE is a good frame to boost academia-industry relationship due to the stable and durable collaborations between the 16 members and the wide spectrum of EPNOE companies, from SME's to some of the largest companies in the world.

In the past, EPNOE organized several brain-storming sessions that all lead to research projects. The next one will take place beginning of June in Wageningen, the Netherlands. It will be the occasion for strengthening research links, organise research around the most promising topics of our Research Road Map and building R&D projects.

In connection with this brain-storming event of next June, this newsletter is strongly focused on R&D research projects in which EPNOE members are playing a leading role.

With my best wishes to all our Newsletter readers.



Dr. Patrick Navard
Coordinator of EPNOE
Centre for Material Forming
Sophia-Antipolis
(France)

news

▶ Forthcoming events

EPNOE brainstorming meeting

The meeting will take place in Wageningen (Netherlands) from 1 to 3 June. EPNOE academic and research members, as well as industrial (BIC) members, will be able to interact and build collaborative projects.

2nd Summer School on Cellulose

It will be held at the location of Dow Wolff Cellulosics in Bomlitz (Northern Germany) from August 30 to September 1, 2010. The course is directed to PhD students, industrial participants and other people interested in this field. Contact: Petra Mischnick, +49-531-391-7201 or p.mischnick@tu-bs.de

ISNaPol 2010

The 7th International Symposium on Natural Polymers and Composites (ISNaPol 2010) will be held on 7-10 September 2010 in Brasil. It is an opportunity to expand your network with South American scientists working with exotic polysaccharides and preparing new fibre based composites. More information: <http://www.imc2010.com.br/index.htm>

Seminar and workshop on Chitin

The XVI Seminar and Workshop on "New Aspects of the Chemistry and Applications of Chitin and its Derivatives" will be held in Zakopane, Poland, on 22nd – 24th September 2010.

Contact Conference Secretary: +48 42 638 03 338, ptchit@ibwch.lodz.pl

▶ Members' info

Award

Martin Gericke was awarded the Young Scientist Award sponsored by the Cellulose and Renewable Materials Division of the American Society.





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Zoom on EPNOE- related EC project

STEP-ITN Marie Curie Project



STEP ITN

The Initial Training Network "STEP", funded from the European Community's 7th Framework Programme [FP7/2007-2013] under grant agreement no. 214015, commenced from Oct 1, 2008 with a project lifetime of 4 years. The goal of Initial Training Networks is to improve the career perspectives of young researchers by providing them training in research and complementary skills.

The research focus of the STEP network is to gain fundamental understanding of the non-covalent interactions in polysaccharide structures and utilize the knowledge to develop ways and means of overcoming their influence on polysaccharide conversion processes. The focus of applications of the research results are in the sectors of food, textiles and materials industries.

The network consists of 8 institutions encompassing diverse areas of specialization, who together host and train a total of 16 PhD students (early-stage researchers) and 5 post-doctoral researchers (experienced researchers). A further 6 more institutions collaborate in the network by imparting specialized training to the recruited early-stage and experienced researchers. Six member institutions in STEP are also members of the European Polysaccharide Network of Excellence (EPNOE).

The network organizes regular meetings where researchers present and discuss their research activities. Eminent members of academia and industry are recruited as visiting scientists, and offer key training in their areas of expertise. The meetings are free to attend for any one interested in polysaccharide research. We invite you to actively participate in our meeting and contribute your own research presentations.

More information on our network and its activities may be found on our webpage www.step-itn.eu. Here, you will also be able to download the presentations from our visiting scientists. If you have any queries, please contact us by email at step-itn@uibk.ac.at. We look forward to hearing from you.

Prof. Thomas Bechtold, Coordinator - STEP.

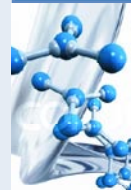
news (continued)

Members' info

New staff

- Konrad Hotzel, PhD student, Topic: Complexes of DNA and cationic cellulose, supervised by Prof. Heinze
- Danny Schirmer, Diploma student, Topic: Chemistry of cellulose in ionic liquids, supervised by Prof. Heinze
- Susanne Schmidt, Diploma student, Topic: Cellulose sulphates for biomedical applications, supervised by Prof. Heinze
- Thomas Wellhöfer, Diploma student, Topic: Aminocelluloses for technical applications, supervised by Prof. Heinze

Forthcoming articles



- Mesophases in a Gel From Hydroxypropyl Cellulose/ Polyacrylamide; *C. Castro-Guerrero, A. Morales-Cepeda, O. Kharisova, A. Koschella, Th. Heinze* - Macromolecular Symposia 2010 (masy.200900173.R1)
- Hydrolysis of regenerated cellulose fibers with cellulases, Chapter 18 in *Advances in Textile Biotechnology*; *T. Bechtold, C.B. Schimper* - Editors: V. Nierstrasz, A. Cavaco-Paulo, Woodhead Publishing Ltd, Cambridge, ISBN: 184569.6255
- Sustainable dyes from agri-food chain co-products, in *Total Food, Sustainability of the agri-food*; *T. Bechtold, A. Mahmud-Ali, S. Komboonchoo* - Editors: K.W. Waldron, G.K. Moates, C.B. Faulds, Proceedings Volume, The Royal Society of Chemistry, Cambridge, ISBN: 978-1-84755-750-6, 211-218
- NaOH/urea aqueous solution improving properties of regenerated cellulosic fabrics; *A. Ehrhardt, H.M. Bui, H. Duelli, T. Bechtold* - *J Appl Polym Sci*, 115, 2865-2874
- Alkali pre-treatment and resin finishing of lyocell: effect of sodium hydroxide pretreatments; *A. Kongdee, A.P. Manian, M. Lenninger, J. Schlagen, T. Bechtold* - *J Appl Polym Sci*, 115 (5) 2898-2910
- Interaction of cellulose with alkali metal ions and complexed heavy metals; *H.B. Öztürk, H. Vu-Manh, T. Bechtold* - *Lenzinger Berichte*, 87, 142-150



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EPNOE-related EC Project

Surfuncell: combining polysaccharides with the nano-world



The Surfuncell project is a large scale integrating project under EC FP7 with a duration of four years and a total budget of eight million €. Since its start in December 2008, six industrial and seven academic partners have developed new ways of modifying the surface of cellulosic materials using polysaccharide derivatives and a wide range of functional nano-particles.

The project is coordinated by Dr. Volker Ribitsch from the University of Graz, Austria. Among the partners several members of the European Polysaccharide Network of Excellence (EPNOE) are active beneficiaries. The University of Maribor, Armines, the University of Jena, TITK and the University of Utrecht contribute, with their expertise, to the successful development of the project.

The aim of the work is the creation of functional surface modifications using polysaccharides and nano-particles, leading to four different demonstrators in the fields of pulp and paper, cellulosic yarns, cellulose films and filter membranes.

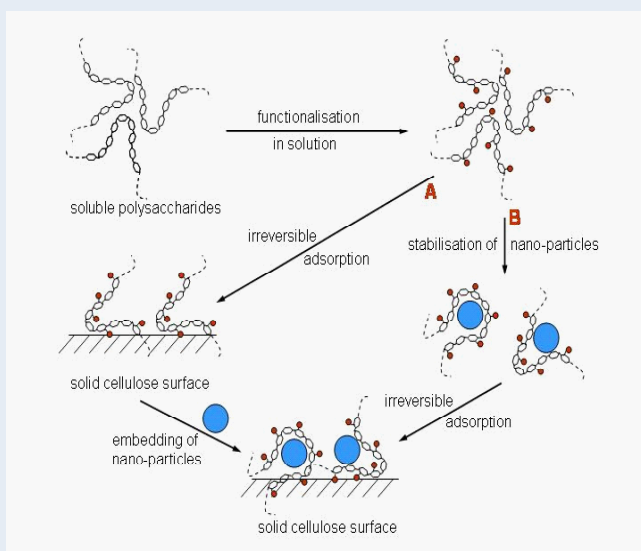


Fig 1 Basic concept of the project Surfuncell

The outcome of the project will on the one side deepen our understanding of interactions between soluble polysaccharides and solid cellulose surfaces, as well as interactions with metallic, metal oxide and polymeric nano-particles. On the other hand, this project can create significant impact on the industrial production of new, functional cellulosic materials.

The project's outcome will show a way to achieve high value materials using the renewable resource cellulose, its derivatives, and state-of-the-art nanotechnology.

Dr Martin Reischl, Prof Volker Ribitsch, University of Graz, Austria



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EPNOE-related EC Project

AFORE: new products from forest biorefineries



The large EU project called AFORE is aimed at developing new technologies for the separation, fractionation and primary upgrading of wood-based polymers and valuable low molecular weight compounds to be used by the wood processing mills of today and the future wood biorefineries.

The main aim of the AFORE project is to develop new, industrially adaptable and techno-economically viable and sustainable methods and technologies for the separation, fractionation, and primary upgrading of wood polymers and low molecular weight compounds from forest residue or process side-streams. These valuable components can then be further utilised as starting materials in chemical, material and fuel applications. The project is focusing both on utilising the side-streams of the kraft pulping process employed in paper making today and on developing new forest biorefinery technologies.

AFORE is evaluating most potential technologies and comparing them to novel process while searching for new product developments.. It is believed that some of the technologies to be developed in the project could be quickly introduced into current processes.



The forest-based industry is a significant industrial sector in Europe converting wood to pulp, paper, cardboard, energy, and other wood derived products. The AFORE research supports the European wood processing industry and its industrial value chain in their aim of developing new business from forest biorefineries according to the principles of sustainable development. It is expected that the results will help the European forest industry, and the pulping industry in particular, to increase profitability and overall income significantly within 10 years, while simultaneously reducing the formation of waste by helping them utilise valuable side-stream components.

The AFORE project (Added-value from polymers and chemicals by new integrated separation, fractionation and upgrading technologies) is a four year project started in 2009 having a budget of EUR 10.9 million. AFORE consortium consists of 19 participants: VTT as the coordinator, 6 other research institutes, universities (4 in total), and industrial partners (8), all of which are seen as leaders in their particular field.

Located across Europe and US, partners will bring together their expertise to tackle the important challenge of transferring forest industry into an efficient lignocellulosic biorefinery, in which the unique chemical composition of all wood fractions is fully exploited.

Project website: <http://www.eu-afore.fi>
For more information, please contact:

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A new book by an EPNOE BIC member "Cellulose Science and Technology"

Author(s): Jean-Luc Wertz, Olivier Bédue, Jean Pierre Mercier
EPFL Press distributed by CRC Press ISBN 978-1-4200-6688
368 pages

Henri Chanzy, Honorary Scientist at CERMAV-CNRS, Grenoble (France), wrote as a foreword to the book:

"It is a common statement to say that cellulose is the world's most abundant polymer. In view of its importance to mankind, an enormous research effort, substantiated by myriads of reports and patents, has been devoted to this biopolymer in the last 150 years. The periodical appearance of textbooks presenting in perspective the major developments of the science of cellulose is therefore crucial for those who want to stay abreast, without being submerged by the overwhelming primary literature. It is in this context that Cellulose Science and Technology is written, summarizing some of the major progresses of the cellulose science in the last 20 years.

Throughout the chapters that successively present the biology, chemistry, physics and technology of cellulose, one of the merits of this book is to account for the special morphology of cellulose and its implication in the various processes that are reviewed. No doubt that this book will serve as a reference for those who are already active in the field of cellulose as well as for those who are interested in biomass utilization and/or in the production of eco-friendly materials from sustainable non-food resources."



The scientific content of the book covers the following items:

Biosynthesis of Cellulose - Structure and Properties of Cellulose - Swelling and Dissolution of Cellulose - Enzymatic Hydrolysis of Cellulose - Non-Biological Degradation of Cellulose - Cellulose Derivatives - Fuels and Chemicals from Biomass

Specifically, the subjects of the biosynthesis, structure, and enzymatic hydrolysis are presented, before a discussion on a more general level, including from the perspectives of polymer science, sugar chemistry and botany. The final chapters of the book enter into the specific subjects of bio-fuels, with perspective for the future. The book is written with the diversity of the audience in mind. It will serve as a reference book for polymer scientists and engineers, but it is also accessible to students in these and related fields, including environmental sciences.

It took us 6 years to complete the project of this book, trying to include all biological, chemical, physical aspects of the topic - which I think was never done before. I sincerely hope you will enjoy reading it, and I am of course waiting for your comments and suggestions.

Olivier BEDUE, SPONTEX Technical Center Beauvais, France