Autumn is bringing new challenges to EPNOE scientists. Like leaves falling from trees in our forests, new calls for collaborative projects are falling from the European Commission. Already, EPNOE scientists have enjoyed their first success with two large projects having been accepted mid-2008:
1. STEP, coordinated by Dornbirn (Marie Curie Research network, 4.3 Meuros).
2. Surfuncell, coordinated by Graz (research project, 8 Meuros).

In September 2008, EPNOE scientists submitted four other projects, two of which have already passed the first stage:
1. Biorefining of agrobiomass by-products (Marie Curie network), coordinated by VTT.
2. Bioplastics (Marie Curie network), coordinated by Armines.
3. H2n0 (research project packaging), coordinated by Wageningen (passed first stage).
4. AFORE (research project forest biorefinery area related), coordinated by VTT (passed first stage).

There will be opportunities to discuss the latest EC calls and to prepare the organisation of proposals during the EPNOE Business and Industry Club (BIC) meeting being held in Hamburg on October 9 & 10 and at other EPNOE meetings. When successful these projects are boosting our research capacities and offering many PhD students and post-doctoral scientists the opportunity to become experts in polysaccharide research. As a consequence they will move on to industry where there is an extensive and increasing demand for high level scientists able to understand the scientific, technological and societal challenges associated with the field of biomass-based polymers.

Dr. Patrick Navard
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"Nature produces polysaccharides, EPNOE turns them into materials"
news

Members’ info

New lab:
A new Christian-Doppler lab «Advanced cellulose chemistry and analytics» was founded at the Department of Chemistry, BOKU University Vienna. Financed 50% from five industrial partners and 50% from the Austrian government for a total of 7 years, the lab consisting of a team of 5 PhD students and postdocs under the supervision of Univ.Prof. Thomas Rosenu and Ao.Univ.Prof. Antje Potthast will conduct research into basic and applied aspects of cellulose chemistry.

Collaboration:
The University of Maribor (Slovenia) and Abo Akademi (Finland) are cooperating on analysis and functionalization of spruce galactoglucomannans. Docent Stefan Willför from ABO visited Maribor in April and Aleš Doliška Abo in August. The ultimate goal is to develop a polysaccharide formulation, which can be used for anticoagulation in medicine.

Forthcoming articles

Influence of the functionalization pattern of ethyl cellulose on the interactions with polystyrene latex particles in aqueous mixtures; W.A. Wennerstrand, M. Olsson, L. Järnström, A. Koschella, D. Fenn, T. Heinze - Journal of Colloid and Interface Science


Phthalimide-N-oxyl (PINO) Radical, a Powerful Catalytic Agent, Its Generation and Versatility Towards Various Organic Substrates; S. Coseri - Catalysis Reviews

Water soluble sulfonylmethyl-β-cyclodextrin complex: physico-chemical characterization and preliminary pharmacological studies; L. Miron, M. Mares, V. Nastasa, M. Spulber, A. Fifere, M. Pintea, V. Harabagiu, B. C. Simionescu - Journal of Inclusion Phenomena and Macrocyclic Chemistry

Polydimethylsiloxane modified chitosan. III. Preparation and characterisation of hybrid membranes; D. Enescu, V. Hamciuc, R. Ardeleanu, M. Cristina, A. Ioanid, V. Harabagiu, B. C. Simionescu - Carbohydrate Polymers


Dressing Sponges from Chitosan and Chitosan-Alginat Fibres; M. Kucharska, A. Niekraszewicz, M. wisniewska-Wrona, K. Brzoza-Malczewska - Fibres & Textiles in Eastern Europe

Effect of NaOH Treatment on Swelling and Dyeing Properties of Lyocell Fibers; H.B. Öztürk, T. Bechtold - Fibers & Textiles in Eastern Europe

Splitting Tendency of Cellulosic Fibers Part 3: Splitting Tendency of Viscose and Modal Fibers, H.B. Öztürk, T. Bechtold - Cellulose


C1 Reactive Black as a visible crosslinker to Improve Physical Properties of Lyocell Fibers; H.M. Bui, A. Ehrhardt, T. Bechtold - Cellulose


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Forthcoming articles
“Nature produces polysaccharides, EPNOE turns them into materials”

Description of EPNOE research

Life Cycle Assessment

Life Cycle Assessment (LCA) is the most important method for assessing the environmental impacts of a product. It is an internationally standardized approach (ISO) that covers all life stages of a product. LCA encompasses the entire process chain covering all steps from the extraction or cultivation of raw materials, via pretreatment, conversion and downstream processing and, in addition, the product usage and waste management.

LCA is applied:
- As an input for decision making in ongoing R&D
- For identifying improvement options and improvement potentials in existing processes
- In order to make strategic decisions about future R&D and to take investment decisions
- To support decision making of public bodies (e.g., for decisions on research funding and policy making)
- For corporate environmental reporting and for marketing reasons.

Within EPNOE, LCA services are offered by the Department of Science, Technology and Society (STS) at Utrecht University in the Netherlands. In the past, Utrecht University has conducted environmental assessments of man-made cellulose fibres, starch polymers, bio-based packaging films and bio-based chemicals produced by biotechnology and by C1 chemistry.

The body of work done (by Utrecht University and by others) shows the clear potential of bio-based chemicals to reduce the environmental impacts, in particular those related to non-renewable energy use and greenhouse gas emissions. The work also shows that substantial differences in

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Martin Patel
Leader of the LCA activity
University of Utrecht (The Netherlands)
With the goal of developing more functionalized materials, the research and development activities of the Laboratory for Characterisation and Processing of Polymers (LCPP) are concentrated on modification of oriented polymers using various polysaccharides from the solution onto the outer surface and onto/into accessible inner surfaces of the polymer materials as well as on nano – coatings (Figure 1). At LCPP different analyses of polymers with the accent on surface modifications are performed in order to define surface morphology, streaming potential, surface charge, the quality and quantity of specific dissociable and accessible groups, their dissociation constant (pK values) in solvents of different polarity, contact angle, quantity and quality of surface energy and adsorption character.

**Functionalisation by specific adsorption**

Chitosan coating at the material finishing stage leads to advanced products for different every day use and especially medical treatments. Antimicrobial properties, especially with regard to the reduction of pathogen bacteria, can be evaluated using conductometric titration (Figure 2), while the adsorption behaviour of chitosan on PET model film surfaces can be monitored using the quartz crystal microbalance (QCM) technique as detecting a submonolayer of adsorbate on the quartz crystal surface.

**Nano treatment**

Applications of monodisperse silica nanoparticles (SiO2) on activated cellulose fibres (Figure 3) via the sol-gel process result in shifting the temperature at which cellulose starts to degrade to higher values. Self-cleaning textile surfaces can be prepared using TiO2 nano-coating via different procedures. Nanomodification of textiles by magnetic particles alters their protective ability against electromagnetic radiation caused by different advanced devices.

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http://loppm.fs.uni-mb.si

Prof. Dr. Karin Stana-Kleinschek, EPNOE Vice-president Research and Dr. Zdenka Peršin, EPNOE Research Officer; University of Maribor, Faculty of Mechanical Engineering, Laboratory for Characterisation and processing of Polymers.
2nd Business and Industry Club (BIC) meeting:
A very profitable and rich meeting took place in Hamburg on October 9-10, 2008.

Programme of the 2nd BIC meeting:
Thursday 9 October
14:00 - 14:20 Welcome – Overview of BIC - P. Navard (Sophia Antipolis, France)
14:20 - 14:50 Presentation of the fundamental research directions of EPNOE - T. Heinze (Jena, Germany)
14:50 - 15:20 Towards understanding Food Polysaccharide Functionality on a Molecular Level - H. Schols (Wageningen, the Netherlands)
15:20 - 15:50 Enzymes as smart tools in tailoring biomaterials - Anna Suurnäkki (Helsinki, Finland)
15:50 - 17:00 Coffee break and EPNOE academic institution poster session.
17:00 - 17:30 Lignocellulose biorefinery - J. Puls (Hamburg, Germany)
17:30 - 18:15 General discussion
18:15 End of afternoon session
19:00 Dinner

Friday 10 October
8:30 - 9:00 EC projects: EC call, EPNOE projects that are planned and opportunities for BIC members - K. Stana Kleinschek (Maribor, Slovenia)
9:00 - 9:30 Controlling cellulose dissolution: thermodynamical versus structural effects - P. Navard (Sophia Antipolis, France)
9:30 - 10:00 Polysaccharide coatings in medical applications - K. Stana-Kleinschek (Maribor, Slovenia)
10:00 - 11:00 Coffee break and BIC industrial partner poster session.
11:00 - 11:30 Scientific strategies towards new textile fibres - T. Bechtold (Innsbruck, Austria)
11:30 - 11:50 Overview of the three EPNOE market studies - Danuta Ciechanska (Lodz, Poland), J. van Dam (Wageningen, the Netherlands) and M. Patel (Utrecht, the Netherlands)
11:50 - 12:15 EPNOE Education actions - 1st EPNOE conference – Pedro Fardim (Åbo Finland)
12:15 - 12:30 Conclusion - End of meeting