



European Polysaccharide Network of Excellence

Nature produces polysaccharides, EPNOE turns them into materials

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NEWS

► Prospects for Cellulose

The Thuringian Institute for Textile and Plastics Research (TITK) hosted the 7th International Symposium "Alternative Cellulose" on September the 6th and 7th 2006.

31 international specialists from science and industry presented and discussed their latest research on "Manufacturing", "Forming" and "Properties". Themes of the symposium were the development of eco-friendly forming processes and the integration of special properties into cellulose.

More information on www.titk.de

► New Book

Esterification of Polysaccharides

Springer Laboratory, 2006, ISBN 3-540-32103-9

Thomas Heinze, Tim Liebert, Andreas Koschella, University of Jena, Germany

New acylation methods yielding tailored biocompatible materials for specific applications, e.g., biotechnology, sensor technique and medicine and strategies of analysis (Spectroscopic data are extensively discussed) are reviewed. Unconventional solvents are described for completely homogeneous acylation reaction applying state of the art techniques of modern organic chemistry for polysaccharide modification.

► New Workshops

- Institute of Biopolymers and Chemical Fibres is the seat of the Polish Chitin Society and will organize the 12th Workshop "New aspects on chemistry and application of chitin and its derivatives" on September 20-22nd, 2007 in Szczyrk, Poland.

For more information, email to ibwch@ibwch.lodz.pl

- The workshop "Fundamentals of Hydrocolloid Technology" is to be held on March 26th to 29th 2007 at the University of Nottingham, in conjunction with NEWI (Wrexham) and EPNOE. Further details from Mrs Val Street (val.street@nottingham.ac.uk)

In case you need more information, visit our web site www.epnoe.eu or send an email to info@epnoe.eu

EDITORIAL



EPNOE is much more than a classical European project. It is the fruit of the willingness of important research groups in the field of polysaccharides to work together in a new way: common planning of research, common building of research tools, common organisation of education.

This will be performed in a sustainable way (i.e.: it will not stop after a few year) by inventing a new type of research organisation, able to integrate in an effective way the research

and education power of 17 research institutes.

Polysaccharides are the most abundant source of bio-plastics on earth. It is a key EU strategic issue: biomass-based materials will decrease the dependence of EU towards oil producing countries.

The lack of knowledge is the most evident barrier for the development of new polysaccharide-based materials. Bringing together very different disciplines will create new knowledge and new application opportunities. The use of the great variability of the polysaccharides produced in nature should allow the invention of new materials, if the proper synergy of scientific expertise and the adequate establishment of integration structures are combined.

EPNOE will address these needs by providing its partners with an area of trustiness and collaboration to perform the best world-class, multidisciplinary research on polysaccharides, develop a strong link with EU industry to invent new materials and disseminate polysaccharide knowledge at all levels of the society.

Network of Excellence

What is a Network of Excellence (NoE) ?

"Network of Excellence" are a novel type of virtual research organization in Europe, implemented by the European Commission.

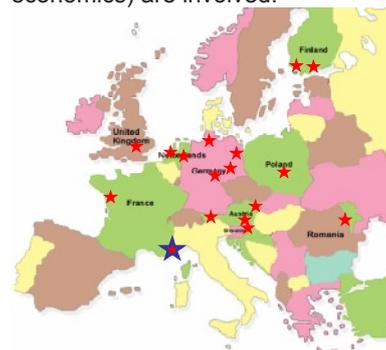
According to its definition, the purpose of such a network is to strengthen excellence in a particular research field by networking resources and expertise and thereby creating critical mass on the global level.

A network of excellence is therefore an instrument designed primarily to address the fragmentation of research (in Europe) on a particular topic, whereby the main deliverable will be the restructuring and reshaping of the way research is carried out on that topic.

It is thought to be the first step towards the construction of the new European Research Area.

What is EPNOE?

The European Polysaccharide Network of Excellence is one of the Networks of Excellence already running. It is composed of 17 research groups from nine countries, covering the entire range of needed expertise: all the major polysaccharides (starch, cellulose, hemicelluloses, alginates, chitin) and all necessary disciplines (including chemistry, biology, enzymology, modelling, physics, processing, materials science, simulation, life cycle analysis and economics) are involved.



For more information, email to patrick.navard@epnoe.org

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News

► New PhD Students

University of Jena, Germany

- Stephan Daus "Polysaccharide Bio-assays"
- Martin Gericke "Synthesis of Inorganic Acid Esters of Polysaccharides in Ionic Liquids"
- Nico Michaelis "Nanostructuring of Polysaccharides"

Institut of Biopolymers and Chemical Fibres, Poland

- Kinga Malczewska-Brzoza will be working on Chitosan and its application in hygiene and medicine

University of Nottingham, UK

- Sze Pui Cheryl Mak "Effects of salt on the properties of starch at high and low water contents"

CEMEF, France

- Romain Sescousse "Preparation and use of ultra porous cellulose foams."

► New Staff Member

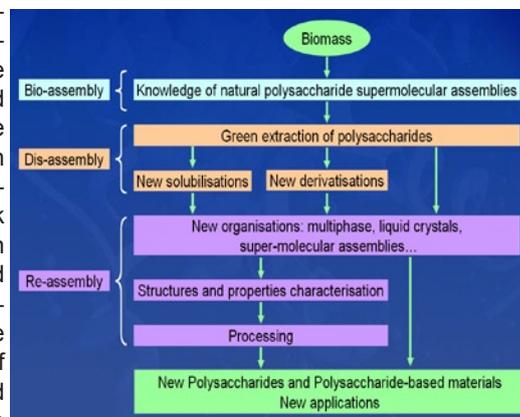
Dr Bettina Wolf has joined the Division of Food Sciences at Nottingham. She has particular expertise in the manipulation of polysaccharide gel structures to produce novel food products.

EPNOE Research Road Map

The planning of Research resulted from several meetings and discussions among the EPNOE partners. A first brainstorming meeting organised in October 2005 in Sophia-Antipolis, focused on extraction, structural characterization and molecular properties; new principles of enzymatic, chemical and physical conversions; new materials, processing and applications. A Task Force was then implemented to define and organise EPNOE research projects. A second brainstorming meeting took place in January 2006 in Wageningen and focused on the creation of fundamental projects. These meetings brought a list of more than one hundred topics of interest and the definition of a Research Road Map. By way of three steps, new innovative polysaccharide-based materials and applications will be elaborated.

The three steps are:

- Bio-assembly: studies of natural polysaccharide supramolecular assemblies
- Dis-assembly: extraction, solubilisation and derivatisation of polysaccharides
- Re-assembly: new organisations, properties and processing



Around this research project portfolio, EPNOE is developing collaborations with industry.

For more information, email to research@epnoe.org

Zoom on EPNOE Partners' Research

Characterisation of insoluble polysaccharides surface and interaction properties

Martin Reischl, Volker Ribitsch, University Graz, Institute of Chemistry

The interaction behaviour of insoluble polysaccharides with surrounding dissolved substances strongly depends on the surface and interface properties of the polymer matrix. Substantial knowledge of these solid/liquid interface properties is inevitable in the control and modification of many technological and medical processes, like textile finishing and papermaking, or the development of biocompatible implant materials and wound dressings.

One important parameter characterising the polymer surface is the zeta-potential. This electrokinetic potential is related to the surface potential and charge, but is also sensitive to changes in adsorption affinity and surface hydrophilicity / hydrophobicity. Moreover, adsorption processes of different substances, like proteins, surfactants, polyelectrolytes and many more can be monitored via zeta-potential measurements.

For these reasons, the workgroup Colloids and Polymers at the Karl-Franzens-University in Graz developed a novel instrument for the fast, reliable and easy-to-use measurement of solid polymers zeta-potential.

The adsorption of surface active components onto a solid surface can be monitored using zeta potential measurements [1]. Figure 1 shows the changes in zeta-potential caused by adsorption of

different ionic surfactants on a man made cellulose fibre.

The surface characterisation of polysaccharides comprises several aspects as basic chemical composition and all possible changes caused by interaction with the liquid phase (swelling), surface modifications and adsorption / desorption processes. The electrokinetic potential / zeta-potential is a very valuable method providing integral information about a macroscopic surface area describing sensitively the interface and surface properties. Any surface modification caused by chemical or physical methods as well as the interaction with solvents and (chemical) components present in the liquid phase and the kinetics of these processes is observed very sensitively.

[1] Reischl M., Stana-Kleinschek K., Ribitsch V.; Materials Science Forum 2006, 514-516, 1374-1378

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