N°35 - JULY 2016

European Polysaccharide Network Of Excellence



"Nature makes polysaccharides, EPNOE turns them into products"

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

editorial

Dear Readers of the EPNOE Newsletter,

"We are facing …. a decrease of the cost of raw materials on the long term, in particular oil" said recently Mme Christine Lagarde; director of the International Monetary Fund (Le Monde, 5 July 2016). Is the low price of oil a good or a bad thing for the development of products based on polysaccharides ? There have been many reports about the bad sides, mainly the fact that oil being so cheap, bio-based products are less financially attractive and thus not any more competitive. But there might be a good side. The low price of oil will push the polysaccharide community to be more imaginative, more adventurous, more ambitious, more turned towards novelties in new scientific areas, in order to meet the societal demand for environmentally friendly products. The development of products which are not really able to meet the market might be stopped, but we may see the coming of new ideas able to generate totally new materials and products.

Let's be positive: the low cost of oil is a chance to be taken for pushing the limit of our knowledge. This is our challenge.

It is now the time of vacation and rest for the Northern hemisphere. Let's wish to all who will take some free time for leisure and family a quiet and nice rest.

With my best wishes,

Dr. Patrick Navard
Coordinator of EPNOE
Armines/Mines ParisTech/CNRS
CEMEF - Centre for Material Forming
Sophia-Antipolis
(France)

news

Member's info

Award:

• At **University of Innsbruck,** Austria:

The Research Institute of Textile Chemistry/Physics of the University of Innsbruck, Austria, was awarded an Endowed Professorship by the Austrian Federal Ministry of Infrastructure and Technology. The focus of the newly established chair is on advanced technical textiles and textile-based composites, including cellulose-based fibre-reinforced composites for lightweight applications.

New staff:

• At **ARMINES-Alès**, France:

- Ichem Chala, on "Functionalization of natural fibers by radiation-grafting". Work supervised by B. Otazaghine, C. Longuet and R. Sonnier (C2MA) in the frame of FERIA project.

- Benjamin Barthod-Malat, on "Characterization of hydrophobic flax fabrics". Work supervised jointly by U. Massika Behary, C. Campage (ENSAIT), B. Otazaghine, R. Sonnier, N. Le Moigne (C2MA) in the frame of FERIA project.

- Thibault Roumier, on "Improvement of interface in thermoset composites reinforced with natural fibers". Work supervised jointly by X. Coqueret (ICMR), R. Léger, P. Ienny and R. Sonnier (C2MA) in the frame of BIONICOMP project.

• At the **Friedrich Schiller University of Jena**, Germany:

- Dr. Hendryk Würfel joined the group as postdoc working in the field of photoresponsible polysaccharide derivatives. Supervisor: Prof. Heinze.

All rights reserved - copyright ® 2016- EPNOE

European Polysaccharide Network Of Excellence



"Nature makes polysaccharides, EPNOE turns them into products"

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

Conferences organised by EPNOE members

• "Petru Poni" Institute of Macromolecular Chemistry Iasi, Romania organized T**he Eight Cristofor I. Simionescu Symposium, Frontiers in Macromolecular and Supramolecular Science, May 29 – June 3, 2016**. Among plenary lectures: Jean M. J. Frechet, "Polymers for Biological Applications"; Sergiu Coseri, "Engineering Raw Natural Products: Cellulose Case". http://www.icmpp.ro/events/conferences/eighth/Program%20CIS2016.pdf

• "Petru Poni" Institute of Macromolecular Chemistry Iasi, Romania organized **The 12th International Conference on Colloid and Surface Chemistry, May 16 – June 18, 2016.** Among plenary lectures: Björn Lindman, "Competing Forces in Cellulose Dissolution"; Mariana Pinteala, "Non-Viral Delivery Systems for Gene Therapy". https://iccsc2016.wordpress.com/

• "Petru Poni" Institute of Macromolecular Chemistry Iasi, Romania will organize **The 3rd International Conference on Analytical Chemistry, August 29 – 31, 2016.**

http://roicac.acadiasi.ro/

• **XIIth French-Romanian Polymer Meeting, 5-7 September 2016, Sophia Antipolis, France**

In 1993, enthusiastic French and Romanian researchers launched in Iaşi (Romania) the 1st French-Romanian Meeting on Polymers. Over time, these biannual meetings have fostered the birth and development of many fruitful collaborations between the two countries.

In 2016, the Materials Forming Center (CEMEF) of Mines ParisTech in Sophia Antipolis, the Nice Sophia Antipolis University and the Institute of Macromolecular Chemistry "Petru Poni" of the Romanian Academy, Iasi, are organizing the 12th edition of the French-Romanian Meeting on Polymers, held in Sophia Antipolis (Alpes-Maritimes, France) from 5 to 7 September 2016.

www.fr-polymeeting.sciencesconf.org

news

Member's info

New staff:

• At the **Friedrich Schiller University of Jena**, Germany:

- M. Sc. Pascal Oesau joined the group as PhD student working in the field of photoactive polysaccharide derivatives for analytical purposes. Supervisor: Prof. Heinze.

Masters & PhD defenses:

• At **Armines-CEMEF,** France:

- Guillaume Normand defended his PhD on "Nanocomposites à matrice polypropylène renforcée par une argile lamellaire. Etude de la relation procédé - structure" (Nanocomposites based pn polypropylnene matrix reinforced by a lamellar clay. Study of the relationship process - structure) on April 19th 2016 in Sophia-Antipolis, France.

- Julien Jaxel defended his Master degree in the Université de Lorraine, Nancy, France, on silica aerogels reinforced with cellulose fibers. The work was performed in CEMEF/MINES ParisTech, supervisor: Tatiana Budtova.

• At **"Petru Poni" Institute of Macromolecular Chemistry Iasi,** Romania:

- Daniela Pamfil defended her PhD thesis "New Stimuli-Responsive Biomaterials that include proteins" (supervisor: Dr. Cornelia Vasile, Dr. Maria Cazacu).

- Sanda Bucatariu defended her PhD thesis "Hydrogels with controlled structures for drug controlled release" (supervisor: Dr. Valeria Harabagiu).

- Alina Elena Nicolescu defended her PhD thesis "NMR techniques used in the study of biofluids" (supervisor: Prof. Bogdan C. Simionescu).

- Dr. Sergiu Coseri finished his habilitation thesis "Nitroxyl radicals mediated functionalization of biopolymers: from synthesis to application".

All rights reserved - copyright ® 2016- EPNOE



EPNOE News

Conferences organised by EPNOE members
(continued)

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

• **International Seminar on AEROGELS - Synthesis-Properties-Applications in Sophia-Antipolis, France. 22-23 September 2016**

The International Seminar on AEROGELS - Synthesis-Properties-Applications will be organised by MINES ParisTech (Sophia-Antipolis, France) on 22-23 of September 2016.

Sessions will deal with aerogels from polysaccharides and natural products.

For more details please see http://www.cemef.mines-paristech.fr/sections/actualites/3eme-seminaire.

• **2nd International EPNOE Junior Scientists Meeting**

FUTURE PERSPECTIVES IN POLYSACCHARIDE RESEARCH, Sophia Antipolis (France), October 13-14, 2016

The call for abstracts is explicitly addressed to PhD students, Post-Doctoral scientists and junior Assistant Professors (or equivalent) in an early stage of their scientific career. The participants are invited to present recent results of their individual research, as well as to share their ideas on how polysaccharide research will or should advance in the near future. Likewise, senior scientist as well as industrial researchers are explicitly invited to join the auditorium in order to participate in fruitful discussions.

Contacts:

General issues and abstract submission: Martin Gericke (martin.gericke@uni-jena.de)

Registration: Sylvie Massol (sylvie.massol@mines-paristech.fr)

• **6th Avancell Conference "Next generation sustainable products from the forest", Gothenburg, Sweden, October 18-19, 2016.** More information: http://www.avancell.se/

• **The 7th Workshop on Cellulose, Regenerated Cellulose and Cellulose derivatives, Örnsköldsvik, Sweden, November 15-16, 2016**

This 7th semi-annual workshop is for the third time arranged in cooperation between Umeå University and Karlstad University and it is focused on basic and applied studies in the field of dissolving pulps, cellulose, nanocellulose, regenerated cellulose and cellulose derivatives. The workshop is sponsored by leading suppliers of dissolving pulps and machinery which guarantees that the workshop will have a mix of academic and applied presentations.

See: www.cellworkshop.se

All rights reserved - copyright ® 2016 - EPNOE



EPNOE News

Conferences organised by EPNOE members
(continued)

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

• ARMINES-CEMEF is co-organizing **the 45th GFP Annual Colloquium, 15-18 November 2016, Marseille, France**

More information : https://gfp2016.sciencesconf.org/

• **5th EPNOE International Polysaccharide Conference**

POLYSACCHARIDES AND POLYSACCHARIDE-BASED MATERIALS: FROM SCIENCE TO INDUSTRIAL APPLICATION

Erfurt, Germany, September 04 - 07, 2017

EPNOE International Polysaccharide Conferences are now key features of the calendar of European scientific events. The conference has been organized biannually since 2009. The conference aim is to bring together students, scientists and specialists working in industry, universities and research institutes to exchange experiences, present research results, develop a platform for mutual scientific contacts and intensify academic/industry cooperation.

Since 2013, the EPNOE International Polysaccharide Conference has been promoted and organised jointly by the European Polysaccharide Network of Excellence (EPNOE) and the Cellulose and Renewable Materials Division of the American Chemical Society (ACS). On behalf of EPNOE and ACS, we have the pleasure to invite you to participate.

A pre-conference course on "Cellulose solvents for shaping and homogeneous phase chemistry" will be organised on Sunday September 03, 2017.

Contact: epnoe2017@messe-erfurt.de

All rights reserved - copyright ® 2016 - EPNOE



EPNOE News

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

News from the EPNOE Junior group – EPNOE Minisymposium and participation in a lecture series (Carbohydrate Technology) at TU Graz

The EPNOE Junior group participated in a lecture series at TU Graz dedicated to Advanced Master and PhD students. Tanja Wrodnigg (Graz) started the teaching series in the beginning of June with an introduction to carbohydrates chemistry and medical applications of (oligo)saccharides, Rupert Kargl (Maribor) spoke about surface science in polysaccharides whereas Stefan Spirk (Graz) gave an overview on polysaccharide (nano)materials and analytical methods. On 20th of June, Maria Soledad Peresin (VTT) gave a talk about all aspects related to nanofibrillated cellulose and Carmen Freire (Aveiro) was reporting on how bacterial nanocellulose can be produced, processed and finally shaped into applications. Unfortunately, Nicolas Le Moigne (Centre des Matériaux des Mines d'Alès) missed the event, due to family related issues, but provided the presentation on biocomposites, cellulosic fibers, biosynthesis, structure and processing which was finally given by the 'substitute' Stefan Spirk on 21st of June. The last speaker in the lecture series was Manian Avinash (Innsbruck) who provided insights into textiles and fibers. The feedback from the students after the lectures was very positive.

On 22nd of June, the EPNOE Minisymposium in Carbohydrate Technology was organized at TU Graz with contributions from Aveiro, BOKU, Graz, Innsbruck, Maribor, and VTT. The aim was to reflect some recent developments in the design and understanding of polysaccharide based materials. Several aspects were covered, including glycomimetics, biotechnological production of cellulases to novel findings in paper making and how paper fibers can be employed for production of functional materials. Further, cellulose nanomaterials such as nanofibrillated cellulose, nanocomposites/hybrid materials (e.g. with lignins, hemicelluloses or metal nanostructures) as well as cellulose thin films have been discussed from both fundamental and applied point of view.

All rights reserved - copyright ® 2016 - EPNOE

European Polysaccharide Network Of Excellence

EPNOE News

Exploration of the miraculous power of the healing plants

In our Laboratory for characterization and processing of polymers (LCPP), we work a lot with natural ingredients for wound healing. Although herbs have been used in medicine for more than 5000 years, it is only recently that they are again stepping in the front. Through literature review, we found that information concerning quantitative human health benefits of herbal medicines is still rare or dispersed, limiting their proper evaluation. Therefore we are trying to prove efficiency of herbal medicines and we are focused on better understanding of mechanisms of their action by using modern scientific methods, which we have in our laboratory. We are extracting different substances of herbs and we are detecting their healing properties; antimicrobial, antioxidative and also anti-inflammatory activities. Further we are preparing traditional and also most advanced polysaccharide materials, into which we are trying to incorporate different extracts. The major contribution to our research is the use of the electrospinning method, which enable us to prepare new, advanced polysaccharide nano materials, which are contributing to a better healing through mimicking the structures in our skin. More precisely, the nanofibers are forming the skeleton, very similar to the extracellular matrix and through that they promote the process of wound healing. By using Franzes diffusion cells, the releasing properties of prepared materials are measured and through our collaboration with the Faculty of Medicine, we have the possibility to compare the results with biocompatibility tests.

We described a small part of "magical flowers" greatness in the article "A review of herbal medicines in wound healing"(1), where we described 22 plants, already used for wound healing. They promote the skins natural repair mechanisms and have therefore a huge potential for therapeutical use in wound care. As our expertise with herbal extracts and isolates increases and while we employ commonly used scientific methodology to study plants and their extracts from the physiological and pharmacological point of view, the number of herbal products for wound treatment we are considering is increasing. Clinical proofs of herbal product therapeutic effects led to the study of many more herbs for their therapeutic, either curative or preventative roles. Such combination of traditional and modern knowledge can produce novel drugs for wound healing with significantly lowered unwanted side effects. Our laboratory is working in this area.

In the Figure 1 are presented herbs that have proven effects on the wound healing and are used as wound healing agents in traditional medicine around the world. They are more precisely described in our review article.

Figure 1: Figures of most important medicinal plants and their properties with a known or proven effect on wound healing.

1-Maver T, Maver U, Stana Kleinschek K, Smrke DM, Kreft S., "A review of herbal medicines in wound healing". Int J Dermatol. 2015 Jul;54(7):740-51

This article was proposed by Tina Maver and Karin Stana Kleinschek, University of Maribor, Slovenia

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

All rights reserved - copyright ® 2016 - EPNOE

European Polysaccharide Network Of Excellence

EPNOE News

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

The influence of polysaccharide materials on drug release properties

Rising aging population, increasing incidence of chronic diseases such as diabetes and growing obese population are just some of many factors that are responsible for exponential growth of the global wound care market. The latest is expected to reach USD 20.4 Billion by 2021 from USD 17.0 Billion in 2016, growing at a CAGR of 3.6% from 2016 to 2021. However, factors such as high costs of advanced wound care products may restrain the market growth, especially in the cost-sensitive market. That is also the reason for the government support in the form of funding projects with the topic of wound care.

Polysaccharides have an important role in the field of wound dressings, which is one of the research paths in Laboratory for characterization and processing of polymers (LCPP) at University of Maribor, Slovenia. LCCP is working on several national and international projects related to the use of polysaccharides as wound healing materials combined with pharmaceutical drugs, natural ingredients, DNA, different probiotics etc. Different combinations of optimal polysaccharide materials and potent drugs could lead to great improvement in therapeutic efficiency of novel wound dressing materials, especially considering the different treatment approaches for specific wounds. Our results not only show that significant differences in the release profiles can be achieved by incorporating a non-steroid anti-inflammatory drug, diclofenac (DCF) into different materials, but also indicate the importance of a careful drug host material characterization in choosing the right polysaccharide material for the treatment of specific wounds.

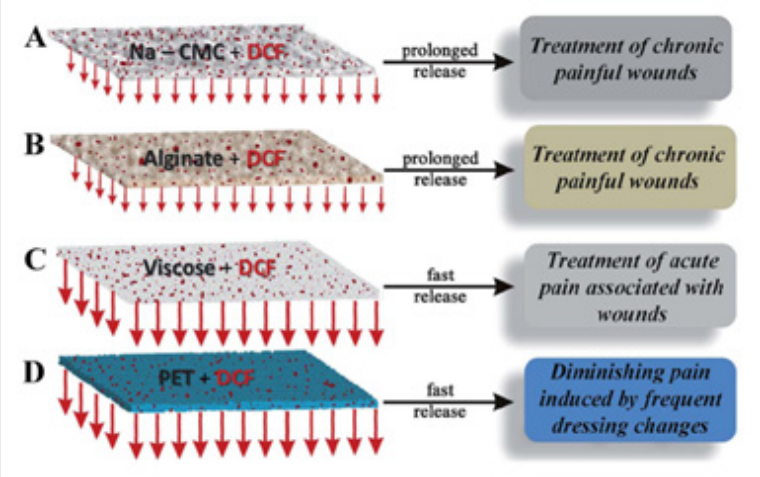


Figure 1: Schematic depiction of the material-drug combinations in vitro release performance and possible wound care applications. a) Na-CMC with incorporated DCF suitable in treatment of chronic wounds, b) Alginate with incorporated DCF for treatment of chronic wounds with an even lower frequency of dressing change, c) Viscose with incorporated DCF for acute pain reduction and d) PET with incorporated DCF as an initial layer in contact with the skin for wounds, requiring frequent dressing change. The drug DCF is depicted in red, while the materials are shown in different colors and morphologies, according to their macroscopic nature. Shorter arrows exhibit a prolonged release, while longer arrows correspond to a faster release.

This article was proposed by Tina Maver, Manja Kurečič and Karin Stana Kleinschek, University of Maribor, Slovenia

All rights reserved - copyright ® 2016 - EPNOE



European Polysaccharide Network Of Excellence

EPNOE News

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

Itaconic acid and methacrylic acid as chemical building blocks of the future

Wageningen UR Food & Biobased Research wants to take a significant step forward in the production of itaconic acid and methacrylic acid for high value materials, such as coatings and inks. These acids that are produced from biomass are interesting alternatives for components that are currently still produced from fossil resources. In the 'MethaForm'-project, Wageningen UR collaborates with Archer Daniels Midland (ADM), EOC Belgium and Van Wijhe Paint on the further development of itaconic acid and methacrylic acid as building blocks for performance materials.

'In this project we are continuing the development of biotechnological processes for the production of itaconic acid from sugars, and catalytic processes for the production of methacrylic acid from itaconic acid' says Daan van Es, project manager from Wageningen UR. 'We want to show the technological feasibility of producing high value polymers and materials, using these bio-based building blocks.'

Methacrylic acid from itaconic acid

Itaconic acid can be obtained by fermentation of sugars. Wageningen UR Food & Biobased Research has developed a chemical process for producing methacrylic acid from itaconic acid. Methacrylic acid is currently still produced from fossil resources. Polymers based on methacrylic acid are being used in the production of coatings and textile, as well as in alternatives for glass, such as plexiglas®.

Comparison in specific applications

In the MethaForm-project researchers want to compare itaconic acid and methacrylic acid in specific applications, since both building blocks are related. Furthermore, they want to show that the bio- based building blocks can be processed in the same way as their petrochemical analogues. MethaForm is complaint with the ambitions of the Dutch Topsector Chemistry, which strives to make the Netherlands the country for green chemistry by 2050, as well as part of the top three producers of smart materials.

BPM R&D programme and symposium

The MethaForm-project is part of the large-scale research programme Biobased Performance Materials (BPM). On Thursday June 16th , Wageningen UR is organising the BPM symposium to address current biobased performance materials research developments – including presentations from ADM, Sabic, Dupont, Van Wijhe Paints, Icopal, Sulzer and Croda.

The goal of the BPM programme is to develop high-quality materials based on biomass; materials that are increasingly applied in practice. The research focuses on two types of polymer materials: polymers produced by plants and polymers from biobased building blocks produced via biotechnology or chemical catalysis. The BPM programme is partly financed by the Dutch government of Economic Affairs via the Top Sector Chemistry.

This article was proposed by dr. DS (Daan) van Es, Wageningen UR Food & Biobased Research, The Netherlands

All rights reserved - copyright ® 2016 - EPNOE



European Polysaccharide Network Of Excellence

EPNOE News

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

Development of performance polyesters based on isoidide

Wageningen UR Food & Biobased Research is identifying opportunities for the production of new biobased polymers on the basis of isoidide. Initiated for this purpose, the project HIPPIE (High-Performance Polymers from Isoidide) is a partnership between Wageningen UR, the US companies ADM and DuPont, and Holland Colours from Apeldoorn, the Netherlands.

Thanks to its highly favourable properties, isoidide is a promising chemical building block for the biobased economy. "It is a symmetrical, thermally stable and reactive monomer which can be extracted from sugar," explains project manager Rutger Knoop from Wageningen UR. "This makes it interesting for a wide range of polyesters. Packaging or building materials can be produced based on isoidide, for instance. And there are other exciting applications possible in the electronics and automotive industries."

New market opportunities

For a cost-effective production of biobased plastics based on isoidide, the substance will need to be produced on a large scale. The HIPPIE project is designed to show whether this is possible. "If the study shows that large-scale production is feasible, this will deliver new market opportunities for the participating companies," Knoop says.

BPM Symposium

The HIPPIE-project is part of the large-scale research programme Biobased Performance Materials (BPM). On Thursday June 16th , Wageningen UR is organising the BPM symposium to address current biobased performance materials research developments – including presentations from ADM, Sabic, Dupont, Sulzer and Croda.

The goal of the BPM programme is to develop high-quality materials based on biomass; materials that are increasingly applied in practice. The research focuses on two types of polymer materials: polymers produced by plants and polymers from biobased building blocks produced via biotechnology or chemical catalysis. The BPM programme is partly financed by the Dutch government of Economic Affairs via the Top Sector Chemistry.

This article was proposed by Wageningen UR Food & Biobased Research, The Netherlands

All rights reserved - copyright ® 2016 - EPNOE

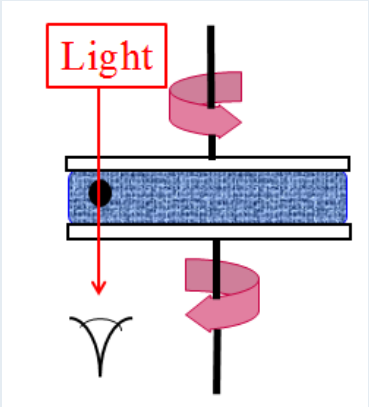


European Polysaccharide Network Of Excellence

EPNOE News

Importance of rheo-optical experiments for interpreting rheological behavior

Rheo-optics is the combination of a flow (rheology) and of an optical observation, which can be optical microscopy or light scattering, for example. Many years ago, Cemef developed such rheo-optical tools, initially for understanding the complex flow of cellulose derivative liquid crystalline solutions (1). Two of these experimental tools built in Cemef are counter rotating devices where both the upper and lower plates of a parallel plate-plate rheometer are transparent and turning in opposite directions. This allows to fix in the framework of the laboratory an object which is submitted to a simple shear flow. It is thus possible to study physical phenomena such as movements of objects (2), dispersion of agglomerated particles (3) or dissolution under flow (4).



Understanding complex rheological results

Rheo-optics is also a good tool for understanding unusual rheological results. We recently helped an EPNOE member having a suspension of polysaccharide particles showing very peculiar behavior with such funny results as moving backwards when applying a shear stress or having "viscosity" going up, then down, then up again with time under a constant imposed stress. Optical observations showed that the suspension was composed of several phases, one of them expelling water under shear, leading to (a) an elastic phase able to store energy, explaining the backward movement and (b) a lubrication of the flow, causing the "viscosity" changes. Viscosity is under brackets because no viscosity can be calculated from torque and plate velocity measurements under such conditions.

Rheo-optical tools in Cemef can be used up to 180°C with very viscous fluids.

1- B. ERNST et P. NAVARD "Band textures in mesomorphic hydroxypropylcellulose solutions", Macromolecules, 22, 1419-1422 (1989) ; E. PEUVREL et P. NAVARD "Flow of a liquid crystalline polymer solution around an obstacle", Liquid Crystals, 7 (1), 95-104 (1990); B. ERNST, P. NAVARD, T. HASHIMOTO et T. TAKEBE "Shear flow of liquid crystalline polymer solutions as investigated by small-angle light scattering", Macromolecules, 23, 1370-1374 (1990)
2- J. DUBOIS, W. FYEN, D. RUSU, E. PEUVREL-DISDIER et P. NAVARD "Small-angle light scattering of polarized light: VI Sphere doublets at rest and during shear",J. Polym. Sci., Polym. Phys. Ed., 36, 2005-2013 (1998)
3- W. LIU, E. TARABUKINA et P.NAVARD "Influence of the elasticity of cellulose solutions on the dispersion of carbon black agglomerates", Cellulose, 20(4), 1679-1690 (2013)
4- N. Le MOIGNE et P. NAVARD "Physics of cellulose xanthate dissolution in sodium hydroxide-water mixtures: a rheo-optical study", Cellulose Chem Tech, 7-8, 217-221 (2010)

This article was proposed by Romain Castellani and Patrick Navard, ARMINES-CEMEF, France

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

All rights reserved - copyright ® 2016 - EPNOE



European Polysaccharide Network Of Excellence

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

EPNOE Member's Scientific Publications

At Armines - Mines d'Alès, France:

BERGES M., LEGER R., PLACET V., PERSON V., CORN S., GABRION X., ROUSSEAU J., RAMASSO E., IENNY P., FONTAINE S., Influence of moisture uptake on the static, cyclic and dynamic behaviour of unidirectional flax fibre-reinforced epoxy laminates, Composites Part A, 88, (2016) 165-177.

BOKU University, Austria:

Pircher, N., Carbajal, L., Schimper, C., Rennhofer, H., Nedelec, J.-M., Lichtenegger, H., Rosenau, T., Liebner, F., Impact of selected solvent systems on the pore and solid structure of cellulose aerogels. Cellulose 23/3 (2016) 1949-1966.

Fontenot, K., Edwards, V., Pircher, N., Liebner, F., Design and activity of point of care protease detection with aerogel sensors derived from cotton. Wound Repair and Regeneration, 24/2 (2016) A1–A34.

Ballner, D., Herzele, S., Keckes, J., Edler, M., Griesser, T., Saake, B., Liebner, F., Potthast, A., Paulik, C., Gindl-Altmutter, W., Lignocellulose nanofiber-reinforced polystyrene produced from composite microspheres obtained in suspension polymerization shows superior mechanical performance. ACS Appl Mater Interfaces 8/21 (2016) 13520–13525.

Zutz, C., Bacher, M., Parich, A., Kluger, B., Gacek-Metthews, A., Schuhmacher, R., Wagner, M., Rychli, K., Strauss, J., Valproic acid induces antimicrobial compound production in Doratomyces microspores. Front Microbiol 7 (2016) 510.

Koprivica, S., Siller, M., Hosoya, T., Roggenstein, W., Rosenau, T., Potthast, A., Regeneration of Aqueous Periodate Solutions by Ozone Treatment: A Sustainable Approach for Dialdehyde Cellulose Production ChemSusChem 9/8 (2016) 825-33.

Ghorbani, M., Liebner, F., Van Herwijnen, E., Pfungen, L., Konnerth, J., Synthesis and Characteriza-tion of Lignin-based Phenol Formaldehyde Resole Adhesives. BioRes 11/3 (2016) 6727-6741.

Hutterer, C., Schild, G., Potthast, A., A precise study on effects that trigger alkaline hemicellulose extraction efficiency. Bioresource Technology 214 (2016) 460-467.

Herzele, S., Veigel, S., Liebner, F., Zimmermann, T., Gindl-Altmutter, W., Reinforcement of polycapro-lactone with microfibrillated lignocellulose. Ind. Crops Prod. 2016, ahead of print, doi:10.1016/ j.indcrop.2015.12.051.

Köhnke, J., Fürst, C., Unterweger, C., Rennhofer, H., Lichtenegger, H., Keckes, J., Emsenhuber, G., Mahendran, A., Liebner, F., Gindl-Altmutter, W., Carbon microparticles from organosolv lignin as filler for conducting poly(lactic acid). Polymers 2016, ahead of print, doi:10.3390/polym8060205.

All rights reserved - copyright ® 2016 - EPNOE



EPNOE Member's Scientific Publications

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

Subscribe to the EPNOE Newsletter on **www.epnoe.eu**

At Armines - CEMEF, France:

L. VO et P. NAVARD
"Treatments of plant biomass for cementitious building materials – A review", Construction and Building Materials, 121, 161–176 (2016)

M. BERCEA et P. NAVARD
"Comparison of elasticity contributions during the flow of a cellulose derivative solution", to appeear in Cellulose Chemistry and Technology

E. BOIX, F. GEORGI et P. NAVARD
"Influence of alkali and Si-based treatments on the physical and chemical characteristics of miscanthus stem fragments", to appear in Industrial Crops and Products

Nela BUCHTOVA, Tatiana BUDTOVA, "Cellulose aero-, cryo- and xerogels: towards understanding of morphology control", Cellulose, published on line May 2016

Diana CIOLACU, Cyrielle RUDAZ, Mihai VASILESCU, Tatiana BUDTOVA, "Physically and chemically cross-linked cellulose cryogels: Structure, properties and application for controlled release" Carbohydrate Polymers, 151, 392-400 (2016).

All rights reserved - copyright ® 2016 - EPNOE