CELL

DIVISION OF CELLULOSE AND RENEWABLE MATERIALS

M. Roman, Program Chair

SUNDAY MORNING

Moscone Center
252/260

Design & Control in Polysaccharide Chemistry: Anselme Payen Award Symposium in Honor of Kevin J. Edgar | Drug Delivery

Cosponsored by CARB

Financially supported by EPNOE, Eastman Chemical Company, VT Fralin Life Science Institute, VT College of Natural Resources and Environment, VT Department of Sustainable Biomaterials, Carbohydrate Polymers (Elsevier)

P. E. Fardim, O. J. Rojas, Organizers
C. M. Buchanan, Organizer, Presiding

8:00 Introductory Remarks.

8:05 1. Polysaccharides in drug delivery: An overview. M.F. Wempe

8:30 2. Polysaccharides in drug delivery: Applications of cellulose derivatives for oral drug delivery. G. Okoh


9:20 4. Withdrawn

9:45 Intermission.

10:00 5. Cellulose nanocrystal conjugates for drug delivery and bioimaging applications. M. Roman

10:50  7. Immunosensor based on cellulose nanofibrils for C-reactive protein detection. Y. Zhang, **O.J. Rojas**


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**Processing & Properties of Biobased Composites & Blends**

Financially supported by EPNOE
J. R. Barone, P. R. Navard, **Organizers, Presiding**

8:05  9. Effect of ethylene glycol-water mixed solvent on the synthesis of iron oxide/carbon nanocomposites and their adsorption performance. **S. Liu**

8:30 10. Solvent-exchanged porous bacterial cellulose nanopaper as reinforcement for polymers. **A. Santmarti**, M. Hervy, K. Lee


9:45 Intermission.

10:00 13. Cellulose/vaterite nanocomposites: Sonochemical synthesis, and their applications in drug delivery and protein adsorption. **L. Fu**, M. Ma, F. Xu, X. Zhang


11:15 16. How can a single methyl group drastically modify the microstructure of a biocomposite and affect its mechanical properties? **A. Gallos**, J. Beaugrand, G. Paes, **F. Allais**
Cellulose Structure & Biosynthesis | In the Plant Cell Wall

Cosponsored by BIOL, BIOT, CARB and ENFL
Financially supported by Department of Energy - Office of Science
P. Langan, H. M. O'Neill, J. Zimmer, Organizers
N. Carpita, D. Cosgrove, Organizers, Presiding

8:00 Introductory Remarks.

8:05 17. 3D Nano-architecture and mechanical properties of Arabidopsis thaliana plant cell walls by cryo-electron tomography of vitreous sections. M. Auer

8:30 18. Visualizing cellulose microfibril movements during stress-induced and endoglucanase-induced extensions of plant primary cell walls. D. Cosgrove


9:45 Intermission.

10:00 21. Polymorphic structures and pectin interactions of cellulose in primary plant cell walls from multidimensional solid-state NMR. T. Wang, P. Phyo, H. Yang, S. Kiemle, D. Cosgrove, J.D. Kubicki, M. Hong


11:15 24. Impact of alterations in lignin deposition on cellulose organization of the plant cell wall. J. Liu, J. Kim, J. Cusumano, C. Chapple, L. Makowski
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Nanocellulose Processing & Analysis | Novel Processes

Cosponsored by AGFD, ANYL, CHAS and I&EC
Financially supported by TAPPI, CelluForce Inc., FPInnovations
W. Y. Hamad, T. Lindström, M. Roman, Organizers
M. Bortner, Organizer, Presiding

8:00 Introductory Remarks.


8:30 26. Ionic liquid-cellulose-in-oil microemulsions: Molecular weight dependence and directed morphology of cellulose nanoparticles. J.R. Alston, N. Redeker, M. Khan, J.M. Mabry


9:45 Intermission.

10:00 29. Cellulose nanostructure obtained by enzymatic hydrolysis: The effects of treatment time. D. Rosa, C. Bauli, D. Rocha

10:25 30. Investigation of surface interactions of micro/nano-cellulose with metal ions at micro-nano-molecular scale. C. Zhu, A. Mathew


11:40 Concluding Remarks.
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Cosponsored by POLY
M. G. Laborie, S. H. Renneckar, N. Robitaille Brown, Organizers
N. Sathitsuksanoh, Organizer, Presiding

8:00 Introductory Remarks.

8:05 33. Plant oil-based acrylic monomers for free radical polymerization. Z. Demchuk, I. Tarnavchyk, O. Shevchuk, V. Kirianchuk, A.S. Voronov

8:30 34. Emulsion copolymerization of vinyl acetate with hydrophobic plant oil-based monomers: Effect of plant oil unsaturation of reaction kinetics. K. Kingsley, O. Shevchuk, I. Tarnavchyk, A. Voronov

8:55 35. Random copolymerization of lactones and hydroxyacid bioaromatics using one-pot Ring Opening Polymerization (ROP) polycondensation method. H. Nguyen, G. Short, P. Qi, S.A. Miller

9:20 36. Water pre- and post-hydrolysis of birch wood to produce high-purity cellulose and xylan-based compounds for material and chemical applications. M. Borrega, H. Sixta

9:45 Intermission.


11:40 Concluding Remarks.
Valorization of Renewable Resources & Residuals into New Materials & Multiphase Systems

Cosponsored by AGFD
J. Campos-Teran, O. J. Rojas, Organizers
M. L. Auad, Organizer, Presiding
E. A. Moura, Presiding

8:00 Introductory Remarks.


8:30 42. Novel recycling process for cotton polyester blended waste textiles. S. Haslinger, M. Hummel, H. Sixta


9:20 44. Biocatalytic functionalization of softwood galactoglucomannan through transglycosylation and enzyme engineering. J. Morrill, A. Rosengren, S. Butler, H. Stålbrand

9:45 Intermission.

10:00 45. Electrodes with nanostructures used in the electrochemical analysis of pesticides in aquifers means of organic and conventional banana production in Costa Rica. R. Zamora, R. Starbird

10:25 46. Modified soy protein as encapsulate excipient in pharmaceutical applications. M. Anaya Castro, I. Alric, S. Fullana-Girod, V. Durrieu


SUNDAY AFTERNOON

Moscone Center
252/260

Design & Control in Polysaccharide Chemistry: Anselme Payen Award Symposium in Honor of Kevin J. Edgar | Tissue Engineering

Cosponsored by CARB
Financedly supported by EPNOE, Eastman Chemical Company, VT Fralin Life Science Institute, VT College of Natural Resources and Environment, VT Department of Sustainable Biomaterials, Carbohydrate Polymers (Elsevier)
C. M. Buchanan, O. J. Rojas, Organizers
P. E. Fardim, Organizer, Presiding

1:00 Introductory Remarks.


1:30 50. Nano-designed polysaccharide-based constructs for tissue engineering applications. J.F. Mano

1:55 51. Chemoenzymatic strategy to design alginates for tissue engineering. G. Skjak-Brak


2:45 Intermission.

3:00 53. Glycosaminoglycan nanostructures as mimics of the vascular endothelial glycocalyx. M. Kipper

3:25 54. Polysaccharide based micro-nano structures for tissue engineering. S.G. Kumbar


Processing & Properties of Biobased Composites & Blends

Financially supported by EPNOE
J. R. Barone, P. R. Navard, Organizers, Presiding

1:05 57. Role of non-cellulosic components on the microstructure and physical properties of natural fibres and their biocomposites. N. Le Moigne, J. Acéra Fernandez, A. Caro-bretelle, R. El Hage, A. Le Duc, M. Lozachmeur, P. Bono, A. Bergeret


2:45 Intermission.

3:00 61. Molecular dynamics simulation study of moisture effects on chain mobility in hemicellulose-based bio-nanocomposites as observed by $^{13}$C CP/MAS NMR relaxometry. P. Chen, C. Terenzi, L. Berglund, J. Wohlert


3:50 63. Withdrawn

4:15 64. Treatments of cellulosic fibers to reduce the water absorption in composite reinforcement. M. Ardanuy, H. Ventura, J. Claramunt
1:00 Introductory Remarks.

1:05 65. Evolutionary perspectives on functional differentiation of CESA proteins. A.W. Roberts

1:30 66. Using animal models to study cellulose biosynthesis. K. Nakashima


2:20 68. How many twists in cellulose biosynthesis can we still expect? U. Römling

2:45 Intermission.

3:00 69. Patterns in cellulose fibril formation. M.F. Crowley, M. Himmel, L. Bu

3:25 70. Can an 18-chain cellulose microfibril explain the scattering/diffraction data? Y. Nishiyama, Y. Ogawa, T. Kuribayashi

3:50 71. Relations between co-crystallization and multiscale hydration in celluloses isolated from plants. M.M. Oliveira, A.A. Curvelo, C. Driemeier

4:15 72. Understanding the mechanical induction of macromolecular defects in cellulose nanofibrils by molecular dynamics simulation and scanning probe microscopy. P.N. Ciesielski, R. Wagner, V. Bharadwaj, M. Himmel, J. Killgore, M.F. Crowley

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Nanocellulose Processing & Analysis | Process Parameters

Cosponsored by AGFD, ANYL, CHAS and I&EC
Financially supported by TAPPI, CelluForce Inc., FP Innovations
M. Bortner, T. Lindström, M. Roman, Organizers
W. Y. Hamad, Organizer, Presiding

1:00 Introductory Remarks.

1:05 73. Limiting factors for cellulose nanocrystal yield assessed via TEMPO-mediated oxidation of microcrystalline cellulose. E. Kontturi, R. Salminen, M. Reza, J. Peyre, T. Pääkkönen
1:30 74. Characterization and patterning of anthraquinone functionalized cellulose nanocrystals. A. Sulkanen, Y. Si, G. Sun, G. Liu

1:55 75. Surface polarity engineering of crystalline nanocellulose using a food-grade surfactant for improved sustainable biocomposites. K. Chi, J.M. Catchmark

2:20 76. Microfibrillated cellulose produced with a high consistency enzymatic process. T.C. Maloney, K. Dimic-Misic, S. Ceccherini, J. Kuusisto, A. Suurnäkki, O. Mattila, S. Grönqvist

2:45 Intermission.

3:00 77. Determination of hydrophobicity in amphiphilic nanocellulose imparted by Aqueous Counter Collision (ACC). T. Kondo, K. Tsuboi, S. Yokota

3:25 78. Understanding cell wall longitudinal structure for producing cellulose nanofibrils by disk milling with dilute acid prehydrolysis. J. Zhu


4:15 80. Influence of monosaccharide composition in TEMPO-mediated oxidation to produce cellulose nanofibrils from corn husk and banana rachis. C. Gomez Hoyos, J. Velázquez-Cock, A.M. Serpa Guerra, R. Zuluaga Gallego, C. Castro Herazo

4:40 Concluding Remarks.
2:20 84. Cellulose nanofibril-cell adhesive peptide conjugates for 3D bioprinted tissue models. E. Karabulut, A. Sousa Morais, P. Gatenholm

2:45 Intermission.


3:50 87. Chemical modifications for the synthesis of functional materials from sustainable nano/cellulose. K. Zhang

4:15 Introduction of the KINGFA Award winner.

4:20 88. Optimizing both thermal and colloidal stability of cellulose nanocrystal through acid hydrolysis. E.D. Cranston, O. Vanderfleet, M.S. Reid

Section F
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Valorization of Renewable Resources & Residuals into New Materials & Multiphase Systems

Cosponsored by AGFD
M. L. Auad, O. J. Rojas, Organizers
J. Campos-Teran, Organizer, Presiding
K. A. Oksman, Presiding

1:00 Introductory Remarks.

1:05 89. Biomass conversion into functional bioplastics and gels. U.M. Edlund


1:55 91. Sugar produced from corncob pretreated with the combination of electron beam irradiation and enzymes. E.S. Pascoal, E.K. Kleingesinds, E.A. Moura, A.B. Lugão, R.C. Rodrigues

2:20 92. Chromatographic purification of sugar cane bagasse alkaline extract. v. oriez, P. Pontalier, J. Peydecastaing
2:45 Intermission.

3:00 93. Energy efficient separation process of nanofibrils from bioresidues and their use in biocomposites. **K.A. Oksman**, L. Berglund, Y. Aitomaki

3:25 94. Torrefaction analysis of woody biomasses from fast-growing plantations of Costa Rica. R. Moya, A. Rodríguez-Zúñiga, **A. Puente**


4:15 96. $\alpha$-Eleostearic acid extraction by saponification of tung oil and its subsequent polymerization. **A. Murawski**, R. Quirino

**Holy Grails in Chemistry: Celebrating the 50th Anniversary of Accounts of Chemical Research Journal**
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**SUNDAY EVENING**

Moscone Center
Hall D

**General Posters**

M. Roman, *Organizer*

7:00 - 9:00

97. Aminoethyl cellulose: *E. coli* ’s building material for a biofilm matrix. **W. Thongsomboon**, L. Cegelski

98. From cellulose tissue papers to nanoporous membrane actuators. **H. Lin**, J.W. Dunlop, J. Yuan


100. Combined steam and dry reforming of methane over nickel-based catalysts for upgrading biomass gasification-derived syngas. **E. Terrell**, C. Theegala
101. Acetic acid as a precatalyst to promote cellulose dissolution. Y. Hu, S. Acharya, N. Abidi

102. Molecular dynamics study of chitin crystal models in ionic liquids. T. Uto, K. Yamamoto, J. Kadokawa

103. Preparation of amylose-grafted chitin nanofiber gels. N. Egashira, K. Yamamoto, J. Kadokawa

104. Chemoenzymatic synthesis and gelation behavior of amylose-grafted poly(γ-glutamic acid). T. Shouji, J. Kadokawa, K. Yamamoto

105. Withdrawn

106. Polyamide-polysiloxane-copolymers as examples for partially biobased thermoplastic elastomers. M.A. Haslböck, C. Zollfrank

107. Antibacterial chitosan films containing quaternary ammonium salts modified nanocrystalline cellulose. L. Ying, X. Ren, G. Buschle-Diller


111. 3D Porous structures based on lignin. M.L. Auad, I. Flipponen, T. Hinkle, C. Upp

112. What are the ranges and basis of auxeticity in the phases of cellulose microfibrils?. A. Asamoah

113. Laccase-polymerization of ultrasound extracted bamboo substrates. J. Fu, A. Cavaco-Paulo

114. Toward development of new generation of peat granular products for waste water remediation: Reaction mechanism of peat surface with cations of heavy metals. V.G. Goncharov, H.J. Leopold, L. Kildyshova, I.V. Kolomitsyn

115. Preparation and characterization of antibacterial films by pretreatment of dioxane from Phyllostachys pubescens. Q.W. Li, G. Hui, R. Jun, G. Ying

116. High strength of biocomposite film prepared from hemicelluloses and cellulose. R. Jun, G. Ying, Q.W. Li, H. Gao

118. Novel approach to achieve thermoplastic arabinobioxylan. M.E. Borjesson, G.J. Westman, A. Larsson, A. Ström

119. Development and investigation of a cellulose-based low adhesion coating for adhesive tapes. S. von Gradowski, M. Nau, M.A. Biesalski

120. Influence of nanofibrillation degree on nanocellulosic aerogel properties. J. Desmaison, B. Seantier, A. Dufresne, J. Bras

121. Direct comparison of protein and lignocellulose fibers as reinforcements in polymer matrix composites. A.M. Davis, L.E. Hanzly, B.L. DeButts, J.R. Barone


123. Dimensional stability analysis of flax fiber reinforced polypropylene composites. A.M. Davis, L.E. Hanzly, B.L. DeButts, J.R. Barone

124. Evaluating seafood industry waste products as valuable sources of chitin and chitosan. B. Barnes, P. Sharma, U. Onuchukwu, V. Volkis

125. Mussel-inspired polysaccharide derivatives as examples of novel strong bioadhesives. M. Petzold, C. Zollfrank


127. Easy process to cellulose-silica hybrid aerogels. A. Berkefeld, M. Schestakow

128. Algae-based biorefinery of Chlorella vulgaris. G. Vaca Medina, C. Mathieu, C. Raynaud

129. Fabrication of CNC/glycerol thin films as substrate for electronic applications. M. Rivera, V. Pantojas

130. Optimization of phenolics extraction from walnut shells through ultrasound treatment. H. Han, F. Zhang, Y. Wang, J. Jensen, M. Rakita, Q. Han, S. Janaswamy, Q. Xu


133. Impact of vanillin on the rheological and phase behavior of Cellulose Nanocrystals (CNCs). **J. Mao**, R. Ma, M. Laborie


135. Withdrawn

136. Aqueous dispersions of TEMPO-oxidized cellulose nanofibrils with various metal counterions, and their super deodorant performances. **A. Sone**, T. Saito, A. Isogai

137. Microwave-hydrothermal rapid synthesis of cellulose/Ag nanocomposites and their antibacterial activity. **L. Fu**, Y. Liu, S. Liu, M. Ma

138. Withdrawn

139. Sustainable polymer synthesized from gemini monomers. **Z. Wang**


143. Applications of cellulosic waste. Development of insulation panels. L. Beltramini, R. Grether, **A. Guilarducci**, N. Ulibarrie


145. Synthesis of encapsulated bio-pesticides/fertilizers based on superabsorbent crosslinked alginate microbeads. **P. Joshi, M.L. Auad**

146. Characterization of cellulose membrane filters deposited by electrospinning. **J.L. Berrios-Rivera**, V. Pantojas

147. Sequential fractionation of lignin macromolecules with organic solvents and investigation of their potentials for utilization as lignin-PLA copolymers. **S. Park**, J. Choi
148. Development of reinforced rigid polyurethane foam composite based on cabuya fiber. A. Proano

149. Biopolymer synthesis: Esterification of wood cellulose from different Guatemalan tree species with phthalic anhydride and their use as triclosan adsorbents in aqueous solutions. C.E. Torres, J. Carrera, S. Toledo

150. Cleavage of β-O-4 ether bonds in acidic lithium bromide trihydrate for lignin depolymerization. N. Li, X. Yang, X. Lin, X. Pan

151. Conductive hydrogels for use in tissue engineering and biocompatible electronics. B. Cleary, M.L. Auad


155. Pre-treatments to create porous cellulose fibres for nanocellulose production. M. Miranda, C. Driemeier, A.J. Carvalho, n. Belgacem, J. Bras

156. Succinylation of glucomannans from spruce for hydrogel formation. A. Escalante, K. Markstedt, P. Gatenholm, G. Toriz Gonzalez


158. Gelation of 3D printed nanocellulose induced by crosslinked hemicellulose. K. Markstedt, A. Escalante, G. Toriz Gonzalez, P. Gatenholm

159. Effect of the change of the crystalline structure on the infrared spectra by ATR of cellulose from banana rachis, corn husk and bacterial cellulose. A.M. Serpa Guerra, C. Gómez Hoyos, J.A. Velasquez- Cock, P. Gañán, C. Castro Herazo, R. Zuluaga Gallego


161. Characterization of wood and cellulose from different eucalyptus species. R. Teixeira Mendonça, I. Carrilho, M. Pereira

162. Biomaterial polymer blends for material extrusion 3D printing. P. Tayeb, L. Pal, A.H. Tayeb
163. Solution/aggregation behavior of spruce xylan as function of isolation/purification conditions. S. Kishani, A. Escalante, G. Toriz Gonzalez, L. Wagberg, P. Gatenholm

164. Extraction and characterization of nanocellulose from different biomass sources. M. Alwohaibi, C.J. Huntley, M.L. Curry


166. Molecular blending and reinforcing effect of lignin in ductile epoxy resins. F. Ansari, R. Rojas Escontrillas, L. Berglund

167. TEMPO- oxidized Nanofibrillated Cellulose Film (NFC) incorporating Graphene oxide (GO) nanofillers. Y. Kim, Y. Kim


Holy Grails in Chemistry: Celebrating the 50th Anniversary of Accounts of Chemical Research Journal (CANCELLED)
Sponsored by PRES, Cosponsored by BIOL, BMGT, CARB, CATL, CELL, COLL, ENVR, HIST, I&EC, MEDI, ORGN and PROF

MONDAY MORNING

Moscone Center
252/260

Design & Control in Polysaccharide Chemistry: Anselme Payen Award Symposium in Honor of Kevin J. Edgar | Structure

Cosponsored by CARB
Financially supported by EPNOE, Eastman Chemical Company, VT Fralin Life Science Institute, VT College of Natural Resources and Environment, VT Department of Sustainable Biomaterials, Carbohydrate Polymers (Elsevier)
C. M. Buchanan, P. E. Fardim, Organizers
O. J. Rojas, Organizer, Presiding

8:00 Introductory Remarks.
8:05 169. Repeating unit of cellulose is glucose, and why that matters. **A.D. French**


8:55 171. Withdrawn


9:45 Intermission.

10:00 173. Insights in the control of glycosaminoglycan structure. **R.J. Linhardt**

10:25 174. Precision biomaterials based on synthetic heparan sulfate oligosaccharides. **G. Boons**

10:50 175. New views of plant cell wall non-cellulosic polysaccharide and proteoglycan structure from studies of pectin biosynthetic enzymes and plants modified in their expression. **D. Mohnen**, M. Atmodjo, A. Biswal, R. Amos, K. Engle, L. Tan


Section B

Moscone Center
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**Processing & Properties of Biobased Composites & Blends**

Financially supported by EPNOE
P. R. Navard, **Organizer**
J. R. Barone, **Organizer, Presiding**


8:30 178. Substitution of formaldehyde in phenolic thermosets with innovative and bio-based lignin-to-vanillin derived compounds. **S. Caillol**

8:55 179. Manufacturing strong regenerated cellulose fibers reinforced with cellulose nanocrystals. **J. Bhardwaj**, R. Richardson, J. Li, S. Rahatekar


9:45 Intermission.
10:00 181. Design, fabrication and test of degradable starch based tube for a biomedical application. L. Chaunier, D. Velasquez, S. Guessasma, A. Bizeau, F. Faure, A. Meddahi-Pelle, D. Lourdin

10:25 182. Blend configuration in polymeric materials with very high lignin-derivative contents. S. Sarkanen, Y. Wang, Y. Chen

10:50 183. Lignin acidolysis predicts formaldehyde generation in pine wood. C.E. Frazier, G. Wan

11:15 184. Amyloid reinforced polyvinyl alcohol nanocomposites. B.L. DeButts, J.R. Barone

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Cellulose Structure & Biosynthesis | Mechanism of Synthesis

Cosponsored by BIOL, BIOT, CARB and ENFL
Financially supported by Department of Energy - Office of Science
N. Carpita, D. Cosgrove, P. Langan, H. M. O'Neill, Organizers
J. Zimmer, Organizer, Presiding
A. W. Roberts, Presiding

8:00 Introductory Remarks.

8:05 185. Structure and function of cellulose synthase. J. Zimmer


8:55 187. All-atom structural models of plant cellulose synthase and cellulose synthase complex. A. Singh, S. Deshmukh, Y.G. Yingling


9:45 Intermission.

10:00 189. Progress toward structural understanding of cellulose synthesis by plants. B. Nixon, M. Kumar, J. Du, S. Cho, V. Vandavasi, H.M. O'Neill, P. Purushotham, J. Zimmer

10:25 190. Cellulose structure and biosynthesis in oomycetes: Similitudes and differences with higher plants. V. Bulone
10:50 191. Protein structural controls of plant cellulose synthesis. C.H. Haigler


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Nanocellulose Processing & Analysis | Properties

Cosponsored by AGFD, ANYL, CHAS and I&EC
Financially supported by TAPPI, CelluForce Inc., FPIInnovations
M. Bortner, W. Y. Hamad, T. Lindström, Organizers
M. Roman, Organizer, Presiding

8:00 Introductory Remarks.

8:05 193. Solid-State and structural characterization of cellulose nanocrystals. W.Y. Hamad

8:30 194. Comparing crystallinities of CNCs by Raman, NMR, and XRD. U.P. Agarwal, T. Larsson, J. Stevanic Srndovi

8:55 195. Analysis of modified cellulose nanocrystals. W. Thielemans


9:45 Intermission.

10:00 197. Occupational health and safety characterization and assessment of CNC’s from North American producers. B. O'Connor


10:50 199. TEMPO-Oxidized Cellulose Nanofiber (TOCN) materials show good biomedical applications. N. Ruizhi, L. Yi, S. Yamasaki, J. Lin, T. Saito, A. Isogai

11:15 200. Different size-unified cellulose nanocrystals obtained via a multistage separation. Y. Hu, N. Abidi

11:40 Concluding Remarks.
Functional Lignocellulosics & Nanotechnology | Tuning Interfacial Phenomena with Ligno-Nanocellulosic Materials

Cosponsored by CARB and COLL
Financially supported by EPNOE
M. K. Ek, E. Filpponen, T. Nypelo, S. Peresin, S. Spirk, Organizers, Presiding

8:00 Introductory Remarks.

8:05 201. Nanocellulose- Silver hybrid structuration for stable suspension and transparent conductive material design. J. Bras, F. Hoeng, A. Denneulin

8:30 202. Control of the surface properties of cellulose nanocrystals by acylation with functional vinyl esters: Application to the design of innovative fillers or Pickering surfactants. G. Sebe, J. Brand, B. Dhuijege, A. Werner, V. Héroguez


9:20 204. Cellulose nanocrystals and surfactants as mini emulsion polymerization stabilizers. S.A. Kedzior, H.S. Marway, E.D. Cranston

9:45 Intermission.

10:00 205. Fundamental differences due to deposition method in ultrathin films of cellulose nanofibres. B.P. Wilson, K. Yliniemi, M. Gestriansus, M. Putkonen, M. Lundström, T. Tammelin, E. Kontturi


11:15 208. Cellulose macro-sheets with PTFE nanocoating and cellulose nano-sheets. Y. Huang, M. Wu, M. Zhao, S. Kuga
Moscone Center

Chemistry & Physical Chemistry of Thermal Processes for the Circular Carbon Economy

Cosponsored by ENFL and ENVR
H. Mayes, C. J. Pope, Organizers, Presiding

8:00 Introductory Remarks.

8:05 209. Hydrothermal carbonization and the circular economy. M.T. Timko

8:30 210. Utilization of microwave irradiation in the catalytic upgrade of cellulose and hemicellulose derivatives: Hydrolysis and hydrogenation reactions. J. Lopez-Sanchez


9:20 212. Oceans of plastic converted to liquid fuels via small scale thermal depolymerization reactors. S. Ramesh, J.E. Holm, C.J. Pope

9:45 Intermission.

10:00 213. Data science tools for biomass pyrolysis – application to thermochemical conversion of lignin. J. Pfaendtner


10:50 215. On the importance of inorganics composition on biomass gasification. D. Da Silva Perez, C. Dupont


11:40 Concluding Remarks.

Science for a Sustainable Energy Future | Energy Storage
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MONDAY AFTERNOON

Moscone Center
252/260

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C. M. Buchanan, O. J. Rojas, Organizers
P. E. Fardim, Organizer, Presiding

1:00 Introductory Remarks.


1:30 218. Withdrawn

1:55 219. LB film preparation of regioselectively substituted cellulose cinnamates on nematic ordered cellulose templates. T. Kondo

2:20 220. Take advantage of what Nature creates and utilize biomass. A. Albertsson

2:45 Intermission.

3:00 221. Enzymatic control of the acetylation pattern in chitosans. B.M. Moerschbacher

3:25 222. Studying the reactivity of cellulose by oxidation with 4-acetamido-2,2,6,6-tetramethylpiperidine-1-oxo-piperidinium cation. P. Khanjani, V. Lovikka, T.C. Maloney, T. Vuorinen

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Processing & Properties of Biobased Composites & Blends

Financially supported by EPNOE
P. R. Navard, Organizer
J. R. Barone, Organizer, Presiding
J. Ganster, Presiding

1:30 224. Understanding nanoconfinement and nanoscale interfaces in nanocellulose composites. **S. Keten**


2:45 Intermission.

3:00 227. Amyloid reinforced rubber nanocomposites. **B.L. DeButts, L.E. Hanzly, J.R. Barone**

3:25 228. Melt mixing cellulose nanocrystals and industrially relevant polymers. **J. Foster**

Moscone Center
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**Cellulose Structure & Biosynthesis | Synthase Trafficking & Synthesis of plant (1->3),(1->4)-D-glucans**

Cosponsored by BIOL, BIOT, CARB and ENFL
Financially supported by Department of Energy - Office of Science
N. Carpita, D. Cosgrove, P. Langan, J. Zimmer, Organizers
H. M. ONeill, Organizer, Presiding

1:00 Introductory Remarks.


1:30 230. Does cortical microtubule array guide the orientation of cellulose deposition or not? **Y. Gu**

1:55 231. Myosins XI are involved in cellulose synthase complex dynamics and delivery. **W. Zhang, C. Cai, N. Carpita, C.J. Staiger**

2:20 232. Real-time imaging of cellulose microfibril and biosynthesis. **S. Ding**

2:45 Intermission.
3:00 233. Understanding the mechanism of (1,3;1,4)-β-D-glucan synthesis in cereals. **M. Doblin**, Y. Ho, D. Oehme, M.P. Bain, K. Ford, A.M. van de Meene, E.R. Lampugnani, A. Bacic


Moscone Center

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**Nanocellulose Processing & Analysis | Fundamentals**

Cosponsored by AGFD, ANYL, CHAS and I&EC
Financially supported by TAPPI, CelluForce Inc., FPIInnovations
M. Bortner, T. Lindström, M. Roman, Organizers
W. Y. Hamad, Organizer, Presiding

1:00 Introductory Remarks.


1:30 236. Driving forces for cellulose nanocrystal alignment in drying droplets: Center versus edge. F. Navarro Arzate, **C. Pritchard**, M. Bortner, **M. Roman**


2:45 Intermission.

3:00 239. Effect of the size of the charged group on the properties of alkoxylated NFCs. **a. naderi**, T. Larsson, J. Stevanic Srndovi, T. Lindström, J. Erlandsson


3:50 Concluding Remarks.
Section E

Moscone Center

274

Functional Lignocellulosics & Nanotechnology | Modification & Analytics

Cosponsored by CARB and COLL
Financially supported by EPNOE
M. K. Ek, T. Nypelo, S. Peresin, S. Spirk, Organizers
E. Filpponen, Organizer, Presiding
R. Kargl, Presiding

1:05 241. Periodate oxidation and chemical modifications of cellulosic backbone. J. Leguy, Y. Nishiyama, L. Heux, B.R. Jean

1:30 242. Designer molecules for one-step modification of cellulosic materials in aqueous and organic media through the triazine chemistry. A. Fatona, R.M. Berry, M.A. Brook, J. Moran-Mirabal

1:55 243. Dissolution of cellulose in NaOH/zinc nitrate at low temperature. A. Lyu

2:20 244. Withdrawn

2:45 Intermission.

3:00 245. Topochemical modification of nanocellulose in ionic liquids or gamma-valerolactone. T. Laaksonen, A. King, J.K. Helminen, L. Lemetti, D. Rico del Cerro, I. Filpponen, M. Kemell, S. Heikkinen, I. Kilpeläinen

3:25 246. Essential analytical approaches to characterization of lignin specifically targeting the abundant oligomeric fraction observed following a hydrotreatment. A. Kubatova, A. Andrianova, J. Kreft, K. Voeller, J. Schumaker, E.I. Kozliak, I.P. Smoliakova

Section F

Moscone Center

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Valorization of Renewable Resources & Residuals into New Materials & Multiphase Systems

Cosponsored by AGFD
M. L. Auad, J. Campos-Teran, Organizers
O. J. Rojas, Organizer, Presiding
M. Ago, Presiding

1:00 Introductory Remarks.
1:05 247. Silylated lignin and copolymers with acrylonitrile: Flexible membranes and material precursors. S. Li, W. Xie, M. Wilt, J.A. Willoughby, O.J. Rojas


2:45 Intermission.

3:00 251. Fiber-based foams for papermaking. W. Xiang, I. Filpponen, E. Saharinen, K. Salminen, T. Lappalainen, O.J. Rojas

3:25 252. Towards a better understanding of alkali-lignins isolated from three kinds of non-woody materials. F. Yue, F. Lu, R. Sun, J. Ralph

Science for a Sustainable Energy Future
Chemical & Biological Conversions Approaches to Energy Conversion
Sponsored by PRES, Cosponsored by BIOL, BIOT, BMGT, CARB, CATL, CEI, CELL, COLL, ENVR, GEOC, I&EC, MEDI, MPPG, ORGN and PROF

Carbohydrate-Based Hybrid Materials for Nanomedicine
Sponsored by CARB, Cosponsored by CELL

MONDAY EVENING

Moscone Center
Hall D

Sci-Mix

M. Roman, Organizer

8:00 - 10:00
TUESDAY MORNING

Moscone Center
252/260

Design & Control in Polysaccharide Chemistry: Anselme Payen Award Symposium in Honor of Kevin J. Edgar

Novel Derivatives for Demanding Applications

Cosponsored by CARB
Financially supported by EPNOE, Eastman Chemical Company, VT Fralin Life Science Institute, VT College of Natural Resources and Environment, VT Department of Sustainable Biomaterials, Carbohydrate Polymers (Elsevier)

C. M. Buchanan, P. E. Fardim, Organizers
O. J. Rojas, Organizer, Presiding

8:00 Introductory Remarks.

8:05 253. Control of optical anisotropy of cellulose derivatives. M. Yamaguchi, H. Shimada, K. Songsurang

8:30 254. Design of optical films for liquid crystalline displays by control of cellulose ester structure. C.M. Buchanan, N. Buchanan, E. Guzman-Morales, B. Wang


9:20 256. Photo- and biodegradable thermoplastic elastomers containing cellulose and polylactide. J.B. Matson, K.J. Arrington

9:45 Intermission.

10:00 257. Heterogeneous catalysts for the regioselective modification of cellulose. S. Renneckar, S.C. Patankar

10:25 258. Control of cellulose chiral nematic structure. D.G. Gray


Section B
Moscone Center
262

Processing & Properties of Biobased Composites & Blends

Financially supported by EPNOE
P. R. Navard, Organizer
J. R. Barone, Organizer, Presiding
L. Averous, Presiding

8:05 261. New biobased and sustainable epoxy and polyurethane materials and foams from vegetable and microalgal oil. S. Caillol

8:30 262. Polylactide/ZnO nanocomposites: From improved functional properties for packaging to novel materials for biomedicine. E. Lizundia, J.L. Vilas

8:55 263. Green composites from hemp fibers and styrene-free soybean oil-based thermosets: Preparation and modification. W. Liu, R. Qiu


9:45 Intermission.

10:00 265. Biopolymer-based multilayer nanocoatings that exhibit high gas barrier and flame retardant behavior. J.C. Grunlan

10:25 266. Withdrawn

10:50 267. Comparative studies on miscibility and intermolecular interaction for cellulose ester blends with vinyl copolymers. K. Sugimura, Y. Nishio

Cellulose Structure & Biosynthesis | Biochemistry & Cellular Biology

Cosponsored by BIOL, BIOT, CARB and ENFL
Financially supported by Department of Energy - Office of Science
D. Cosgrove, P. Langan, H. M. ONeill, J. Zimmer, Organizers
N. Carpita, Organizer, Presiding
M. Doblin, Presiding

8:00 Introductory Remarks.

8:05 269. Characterization of *Arabidopsis* CSLD cell wall synthase activities both *in vitro* and *in vivo*. G. Bak, F. Gu, J. Combs, M. Pena, B. Urbanowicz, E. Nielsen


9:20 272. Functional differences between CESA protein classes. S. Turner, M. Kumar, L. Mishra

9:45 Intermission.


11:15 276. Bacterial cellulose: Self-assembly and reformatting. S. Lim
Developments in the Fields of Celluloses & Lignocelluloses: In honor of Dr. Rajai Atalla

Cosponsored by AGFD, ANYL and POLY
Financially supported by HORIBA Instruments Incorporated; University of Tokyo, Japan; Innventia AB; U.S. Forest Service
U. P. Agarwal, T. J. Elder, A. Isogai, T. Larsson, Organizers
A. D. French, T. Rosenau, Presiding

8:00 Introductory Remarks.

8:05 277. Evolving models of lignocellulose structure: Do we need a plant cell wall interactome. **W.T. Winter**

8:30 278. Chain polarity in polymorphic unit cells of cellulose, amylose, and chitin. **S.H. Kim**


9:20 280. $^{13}$C NMR method for characterization of partially dissolved cellulose in aqueous media. **D. Topgaard**

9:45 Intermission.

10:00 281. Disordered structures in plant cellulose microfibrils in terms of leveling-off DP and layer-by-layer surface peeling of microfibrils. **A. Isogai**


10:50 283. Fire protection of cellulose materials, procedures and mechanisms. **L. Wagberg, M. Ghanadpour, O. Koklukaya, F. Carosio**

11:15 284. Use of Raman microscopy in elucidating the structure of cellulose. **F. Adar**
Functional Lignocellulosics & Nanotechnology | Tuning Interfacial Phenomena with Ligno-Nanocellulosic Materials

Cosponsored by CARB and COLL
Financially supported by EPNOE
M. K. Ek, E. Filpponen, T. Nypelo, S. Peresin, S. Spirk, Organizers, Presiding


9:45 Intermission.


10:50 291. Tannic acid – A transformative additive when combined with cellulose nanocrystals: From hydrophobic nanoparticles to dried oil powders. E.D. Cranston, Z. Hu, R.H. Pelton

Moscone Center
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Valorization of Renewable Resources & Residuals into New Materials & Multiphase Systems

Cosponsored by AGFD
M. L. Auad, J. Campos-Teran, Organizers
O. J. Rojas, Organizer, Presiding
G. Toriz Gonzalez, Presiding

8:00 Introductory Remarks.

8:05 293. Dissolution and processing of lignocellulose using an ionic liquid solvent: Towards the production of high performance materials. M. Hummel, S. Hellsten, S. Asaadi, Y. Ma, E. Walger, S. Haslinger, H. Sixta

8:30 294. Enzymatically produced lignosulfonate based paper coatings for substitution of petroleum based additives. A. Ortner, K. Hofer, S. Kopacic, g. nyanhongo, W. Bauer, G.M. Guebitz


9:45 Intermission.

10:00 297. Valorization of lignin and cellulose in acid-steam-exploded corn stover by a moderate alkaline ethanol post-treatment based on an integrated biorefinery concept. S. Yang, T. Yuan, R. Sun


10:50 299. Withdrawn

LPS: Chemistry, Synthesis & Applications
Sponsored by CARB, Cosponsored by CELL

Carbohydrate-Based Hybrid Materials for Nanomedicine
Sponsored by CARB, Cosponsored by CELL
TUESDAY AFTERNOON

Moscone Center
252/260

Design & Control in Polysaccharide Chemistry: Anselme Payen Award Symposium in Honor of Kevin J. Edgar | Novel Derivatives for Demanding Applications

Cosponsored by CARB
Financially supported by EPNOE, Eastman Chemical Company, VT Fralin Life Science Institute, VT College of Natural Resources and Environment, VT Department of Sustainable Biomaterials, Carbohydrate Polymers (Elsevier)
P. E. Fardim, O. J. Rojas, Organizers
C. M. Buchanan, Organizer, Presiding

1:00 Introductory Remarks.

1:05 300. Olefin cross-metathesis: Mild, efficient and modular pathway to a new world of polysaccharide derivatives for drug delivery applications. Y. Dong, L.I. Mosquera-Giraldo, L. Taylor, K.J. Edgar

1:30 301. Overview of TEMPO-mediated oxidation of polysaccharides. A. Isogai

1:55 302. Synthesis, properties, and applications of cellulosic diblock copolymers. H. Kamitakahara

2:20 303. Self-healing materials from cellulose. G. Wenz, D. Hafner

2:45 Intermission.


3:25 305. Functionalized and sequence-defined polysaccharides by glycosynthase-catalyzed polymerization. A. Planas

3:50 306. Design and control in polysaccharide chemistry. K.J. Edgar
Processing & Properties of Biobased Composites & Blends

Financially supported by EPNOE
P. R. Navard, Organizer
J. R. Barone, Organizer, Presiding
J. Bras, Presiding

1:05 307. Comparison of biobased multiphase systems based on different thermoplastic polysaccharides (starch, chitosan and alginate) obtained by thermomechanical mixing. L. Averous, E. Pollet

1:30 308. Melt processing of functional protein/polymer blends. J.K. Pokorski, P. Lee

1:55 309. Compression molded composites from waste polyester and cotton textiles. H. Xu, M. Palakurthi, L. Xu, Y. Yang

2:20 310. Crucial role of processing regimes and compatibilization for toughening highly lignin filled polyethylene blends. J. Ganster, J. Erdmann

2:45 Intermission.


Advances in Polysaccharides: Practice & Applications | New Developments in the Industrial Sector

Cosponsored by AGFD, CARB, MPPG‡, PMSE and POLY
A. Biswas, H. Cheng, Organizers
H. Cheng, Presiding

1:00 Introductory Remarks.


2:45 Intermission.


Moscone Center
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**Developments in the Fields of Celluloses & Lignocelluloses: In honor of Dr. Rajai Atalla**

Cosponsored by AGFD, ANYL and POLY
Financially supported by HORIBA Instruments Incorporated; University of Tokyo, Japan; Innventia AB; U.S. Forest Service
U. P. Agarwal, A. Isogai, T. Larsson, *Organizers*
T. J. Elder, *Organizer, Presiding*
W. T. Winter, *Presiding*

1:00 Introductory Remarks.

1:05 319. Monitoring structural changes during fibrillation of cellulose pulp into cellulose nanofibrils. J. Mao, B. Heck, H. Abushammala, G. Reiter, **M.G. Laborie**

1:30 320. Use of *in vitro* biosynthetic systems to understand cellulose formation and properties. **V. Bulone**

1:55 321. Structure-property relationships of nanocellulose fibrils. **G. Nyström**

2:20 322. Withdrawn

2:45 Intermission.
3:00 323. Changes in the supra-molecular structure of cellulose I during TEMPO-oxidation. Bringing together NMR, MD, and XRD results. **T. Larsson**, J. Wohlert, M. Bergensträhle


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**Section E**

Moscone Center
274

Functional Lignocellulosics & Nanotechnology | Dispersions, Gels, Foams, Colloids & Films

Cosponsored by CARB and COLL
Financially supported by EPNOE
M. K. Ek, E. Filpponen, S. Peresin, S. Spirk, Organizers
T. Nypelo, Organizer, Presiding
A. King, Presiding


2:45 Intermission.

3:00 329. Tailoring the surface wettability of cellulose paper/nanopaper via photo-induced click reactions. J. Guo, L. Johansson, **E. Filpponen**, P. Levkin, O.J. Rojas


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**Section F**

Moscone Center
276

Valorization of Renewable Resources & Residuals into New Materials & Multiphase Systems
1:00 Introductory Remarks.

1:05 331. Potential use of pulp and paper industry side streams in composites. **L. Wikström**, J. Keränen


2:45 Intermission.

3:00 335. Industrial biorefinery of lignocellulose for production of biomaterials in China. **R. Sun**


**LPS: Chemistry, Synthesis & Applications**
Sponsored by CARB, Cosponsored by CELL

**Biomass & Biofuel Processing**
Sponsored by ENFL, Cosponsored by CELL, MPPG² and WCC

**WEDNESDAY MORNING**

Moscone Center
252/260

**Bio-based Gels & Porous Materials | Biopolymer Hydrogels**

Cosponsored by AGFD, CARB, COLL, PMSE and POLY
Financially supported by EPNOE
8:00 Introductory Remarks.

8:05 337. Insight into mild condition dissolution of high molecular weight cellulose in ionic liquid based solvent system. S. Acharya, Y. Hu, N. Abidi

8:30 338. Soft gelation of cellulose/DMAc/LiCl solution. R. Liu, C. Zhang, J. Xiang, H. Kang, Y. Huang

8:55 339. Cellulose gels and cryogels via physical and chemical cross-linking. D. Ciolacu, C. Rudaz, M. Vasilescu, T. Budtova

9:20 340. New cellulose sponge and foam made from cellulose fibers through a simple freezing/thawing method. A. Tejado, A. Aramburu, Y. de Miguel

9:45 Intermission.

10:00 341. Rheological behavior of thermosensitive hydrogel suspensions based on Cellulose Nanocrystals with adsorbed thermo-responsive polymer. E. GICQUEL, B. JEAN, J. Engström, C. MARTIN, A.E. Carlmark, J. Bras

10:25 342. Nanocellulose based electrospun membranes for water purification: Tailoring of porosity and functionality. A. Mathew

10:50 343. Robust, dynamic hydrogels with modified cellulose nanocrystals as crosslinkers. K. Zhang

11:15 344. Lignin-based hydrogels with super-swelling capacities. J. Domínguez-Robles, A. Jaaskelainen, A. Rodríguez, T. Tamminen, T. Liitiä, E. Larrañeta, M.S. Peresin

Section B

Moscone Center
262

Processing & Properties of Biobased Composites & Blends

Financially supported by EPNOE
J. R. Barone, P. R. Navard, Organizers, Presiding

8:05 345. Potential of cellulosic nanocomposites materials from cassava pulp. K. Kasemwong, K. Piyachomkwan

8:30 346. Various shapes of chitosan based nanocomposites and their hemostatic ability. Y. Bao, S. Wu, X. Shi, H. Deng, Y. Du


9:45 Intermission.

10:00 349. Cotton-based cellulose nanomaterials for applications in composites and electronics. N. Farahbakhsh, R.A. Venditti, J. Jur


10:50 351. Transparent, macro to nano moldable composites reinforced by cellulose nanofibers. S.K. Biswas, H. Yano


Section C

Moscone Center
270

Advances in Polysaccharides: Practice & Applications | Novel Biocatalytic & Biopolymeric Approaches

Cosponsored by AGFD, CARB, MPPG‡, PMSE and POLY
A. Biswas, H. Cheng, Organizers
G. W. Selling, Presiding

8:05 353. Chemo-enzymatic synthesis and functional properties of well-defined human milk oligosaccharides. G. Boons

8:30 354. Chemo-enzymatic synthesis of homogeneous hyaluronan polysaccharides and their biological applications. J. Fang, P.G. Wang

8:55 355. Chemoenzymatic synthesis of carbohydrates and glycoconjugates. X. Chen


9:45 Intermission.

10:00 357. Enzymatic production of oligosaccharides and polysaccharides for food ingredient applications. R. DiCosimo
10:25 358. Synthesis of well-defined unnatural polysaccharides by phosphorylase-catalyzed enzymatic polymerization. **J. Kadokawa**

10:50 359. Combined enzymatic-ionic liquid treatments to increase the accessibility and reactivity of pulp fibers. **R. Wahlström**, J. Rahikainen, K. Kruus, A. Suurnäkki


Moscone Center
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**Developments in the Fields of Celluloses & Lignocelluloses: In honor of Dr. Rajai Atalla**

Cosponsored by AGFD, ANYL and POLY
Financially supported by HORIBA Instruments Incorporated; University of Tokyo, Japan; U.S. Forest Service
T. J. Elder, A. Isogai, T. Larsson, Organizers
U. P. Agarwal, Organizer, Presiding
O. J. Rojas, Presiding

8:00 Introductory Remarks.

8:05 361. Cellulose crystallinity: What does it mean? **M.F. Crowley**, M. Himmel, L. Bu, Y. Zhang, L. Makowski

8:30 362. Visualization of dynamic changing in formation of cell wall cellulose and callose along with arrangements of microtubules with GFP on surfaces of protoplast cells. **T. Kondo**, S. Tagawa

8:55 363. Explicit modeling and underdetermined (scattering) data to approach a complex reality. **Y. Nishiyama**


9:45 Intermission.

10:00 365. Cellulose II formation by cellulose synthase: Negative data can make themselves positive?. **T. Imai**, J. Sugiyama

10:25 366. Towards an improved understanding of cellulose swelling, dissolution and regeneration at the molecular level. **T. Rosenau**, A. Potthast

10:50 367. Evolution of our understanding of native celluloses. **R.H. Atalla**
Functional Lignocellulosics & Nanotechnology | Dispersions, Gels, Foams, Colloids & Films

Cosponsored by CARB and COLL
Financially supported by EPNOE
M. K. Ek, E. Filpponen, T. Nypelo, S. Spirk, Organizers
S. Peresin, Organizer, Presiding
T. J. Elder, Presiding

8:05 368. Hydrolysis assisted by hydrogen chloride vapor on different cellulose polymorphs. E. Kontturi, E. Niinivaara, S.A. Arshath, A. Bismarck


8:55 370. Withdrawn

9:20 371. Oriented all-cellulose film based on ramie fiber with high mechanical property and transparency. X. Yang, L. Berglund

9:45 Intermission.

10:00 372. Sample geometry dependency on the measured tensile properties of cellulose nanopapers. M. Hervy, A. Santmarti, P. Lahtinen, T. Tammelin, K. Lee


Valorization of Renewable Resources & Residuals into New Materials & Multiphase Systems

Moscone Center
276

Valorization of Renewable Resources & Residuals into New Materials & Multiphase Systems
8:00 Introductory Remarks.

8:05 376. Wood-derived hemicelluloses as green binders in wood adhesives. L. Fogelström, E. Norström, J. Holmqvist, S. Pendergraph, J. Brücher, E.E. Malmstrom

8:30 377. Novel thermoset polymeric networks from fast pyrolysis bio-oil. M.L. Auad, M. Barde, B. Sibaja


9:45 Intermission.

10:00 380. Valorization of starchy, cellulosic, and sugary food waste into value-added chemicals. I. Yu, D. Tsang

10:25 381. Microcellular foaming of arabinoxylan with scCO2. L. Hardelin, A. Ström, A. Larsson

10:50 382. Transforming biomass to chemicals and fuels with light and catalysis. J. Lopez-Sanchez


Carbohydrate-Based Nanomaterials & Drug-Delivery Vehicles
Sponsored by CARB, Cosponsored by CELL

Biomass & Biofuel Processing
Sponsored by ENFL, Cosponsored by CELL, MPPG² and WCC
WEDNESDAY AFTERNOON

Moscone Center
252/260

Bio-based Gels & Porous Materials | Biopolymer Organogels

Cosponsored by AGFD, CARB, COLL, PMSE and POLY
Financially supported by EPNOE
T. Budtova, Organizer
F. Liebner, Organizer, Presiding
H. Mansur, Organizer

1:05 384. Withdrawn

1:30 385. Multifunctional hydrogel dressing material for treatment of chronic wound. I.S. Stefanov, S. Pérez-Rafael, T. Tzanov

1:55 386. Hierarchically porous nanocellulose materials for cartilage applications. N. Naseri, A. Mathew

2:20 387. Cellulose-based hydrogels with encapsulative cyclooligosaccharides to enhance the efficient release of hardly soluble drugs. D. Jeong, S. Joo, S. Jung

2:45 Intermission.

3:00 388. Biomass-derived highly stretchable and elastic hydrogels with effective antimicrobial activity. Y. Si, Z. Zheng, G. Sun


3:50 390. Cellulose aerogels via self-assembling and electrospinning. F. Jiang, Y. Hsieh


Section B

Moscone Center
262

Reactive Extrusion: Advances at the Nexus of Polymer Processing, Materials Technology & Green Chemistry | Advanced Materials & Structures
1:00 Introductory Remarks.

1:05 392. Reactive extrusion of zein with glyoxal and polyethylene maleic anhydride. G.W. Selling, K. Utt

1:30 393. Melt-processing of cellulose pulp and polycaprolactone composites: Wet feeding approach to improve the filler dispersion. G. Lo Re, S. Spinella, F. Vilaseca, L. Berglund

1:55 394. Reactive extrusion compatibilization of cellulose acetate/water soluble polymer blends. R. Quintana Vicente, O. Persenarie, Y. Lemmouchi, L. Bonnaud, P. Dubois

2:20 395. Reactive compatibilizers in the creation of wood fiber plastic composites. J. Pawlak, Y. Wang

2:45 Intermission.

3:00 396. Liquid assisted extrusion process of cellulose nanocomposites. K.A. Oksman, N. Herrera, A. Singh

3:25 397. New insights in melt processing of cellulose nanomaterial based nanocomposites. A. Dufresne

3:50 398. Extrusion technology for nanocomposite containing renewable lignocellulosic materials. R.A. Venditti

4:15 399. Processing of (nano)biocomposite foams by continuous supercritical CO2 assisted extrusion. N. Le Moigne, M. Sauceau, M. Chauvet, M. Benyakhlef, E. Rodier, J. Fages

4:40 Concluding Remarks.

Section C

Advances in Polysaccharides: Practice & Applications | Novel Materials & Methodologies

Cosponsored by AGFD, CARB, MPPG‡, PMSE and POLY
A. Biswas, H. Cheng, Organizers
W. J. Orts, Presiding

1:05 400. Polysaccharide-surfactant association—basics and applications. B. Lindman, T. Nylander, M. Miguel, F. Antunes, F. Cuomo

Functional cellulosic arabinoxylan fiber from agricultural biomass. **M.P. Yadav**, R. Moreau, K.B. Hicks, M. Kale

Strategies toward cellulose nanofibers, porous fibers and hybrids. **Y. Hsieh**

Intermission.

UV-absorbing materials based on natural molecular sunscreens and chitosan. S.C. Fernandes, **V. Bulone**

Higher value films prepared from poly(vinyl alcohol) and amylose-fatty acid derivatives inclusion complexes. **G.W. Selling**, G. Fanta, F.C. Felker, W.T. Hay


Chemical platform for the production of Bio-PET. **R. Smith**

**Develpments in the Fields of Celluloses & Lignocelluloses: In honor of Dr. Rajai Atalla**

Cosponsored by AGFD, ANYL and POLY
Financially supported by HORIBA Instruments Incorporated; University of Tokyo, Japan; Innventia AB; U.S. Forest Service
U. P. Agarwal, T. J. Elder, A. Isogai, T. Larsson, **Organizers**
M. G. Laborie, N. Robitaille Brown, **Presiding**

Introductory Remarks.

Single-sourced nanocelluloses: Process-linked characteristics and behaviors. **Y. Hsieh**

Interactions between cellulose and random and block copolymers: Antifouling and friction. M. Vuoriluoto, H. Orelma, L. Johansson, **O.J. Rojas**

Conformational energy distribution for crystals of cellobiose and analogs. **A.D. French**

2:45 Intermission.

3:00 412. New model for untangling cellulose ultrastructure. **U.P. Agarwal**

3:25 413. Dynamic FTIR as a tool to assess the interaction of lignin in wood pulps. **L. Salmén**

3:50 414. Modeling the mesoscale architecture of lignocellulose to elucidate its impact on transport phenomena and biomass conversion processes. **P.N. Ciesielski, M.F. Crowley, B.S. Donohoe, M. Himmel**

4:15 415. Chemical microscopy of polysaccharide surfaces using TOF-SIMS. **P.E. Fardim**

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Section E

Moscone Center
274

**Functional Lignocellulosics & Nanotechnology | Responsive Materials & Biosensors**

Cosponsored by CARB and COLL
Financially supported by EPNOE
M. K. Ek, T. Nypelo, S. Peresin, *Organizers*
E. Filpponen, S. Spirk, *Organizers, Presiding*

1:05 416. Investigation of the thermodynamics of the interaction of (modified) cellulose nanocrystals with natural polymers. **W. Thielemans**

1:30 417. Cellulose-inorganic hybrid structures as promising thermoelectric materials. **T. Tammelin, M. Gestranius, M. Putkonen, B.P. Wilson, M. Karppinen, E. Kontturi**


2:45 Intermission.

3:00 420. Graft modification of cellulose nanocrystals with carbon dioxide responsive polymers via living radical polymerization. O. Garcia-Valdez, J. Arredondo, P.G. Jessop, P. Champagne, J. Bouchard, **M.F. Cunningham**


Section F

Moscone Center
276

Valorization of Renewable Resources & Residuals into New Materials & Multiphase Systems

Cosponsored by AGFD
M. L. Auad, O. J. Rojas, Organizers
J. Campos-Teran, Organizer, Presiding
G. Toriz Gonzalez, Presiding

1:00 Introductory Remarks.

1:05 424. Withdrawn


2:20 427. Withdrawn.

2:45 Intermission.

3:00 428. Reactive film-forming maleimido dextrans for cysteine-containing surfaces adsorbing BSA. T. Elschner, F. Obst, T.J. Heinze, R. Kargl, K. Stana Kleinschek


Frontiers in Glycoanalytics | MS & NMR Methods

Cosponsored by ANYL, CARB‡ and MPPG‡
Financially supported by Agilent Technologies; Bruker BioSpin Corporation; Postnova Analytics, Incorporated; Rigaku Corporation; Waters Corporation; Wyatt Technology Corporation
G. Boons, M. Roman, Organizers, Presiding

1:10 Introductory Remarks.

1:15 432. MS techniques in structure analysis of complex glycans. F. Vilaplana, A. Martinez-Abad, A. Ruthes


2:20 434. Infrared spectroscopy integrated to mass spectrometry: An innovative platform for de novo carbohydrate sequencing. I. Compagnon

2:45 Intermission.

3:00 435. Examining glycan structure and dynamics with NMR: A tutorial. J.H. Prestegard

3:40 436. Asparagine-linked glycosylation of immunoglobulin G and the Fc gamma receptors impacts immune system activation. A.W. Barb

4:05 437. NMR Analysis of substituent distribution in polysaccharide derivatives. S. Liu, K.J. Edgar

4:30 438. Solid-state NMR methods to determine glycan structure, intermolecular interactions and protein binding in plant cell walls. T. Wang, P. Phyo, Y. Chen, D. Cosgrove, M. Hong

Carbohydrate-Based Nanomaterials & Drug-Delivery Vehicles
Sponsored by CARB, Cosponsored by CELL

Biomass & Biofuel Processing
Sponsored by ENFL, Cosponsored by CELL, MPPG‡ and WCC
THURSDAY MORNING

Moscone Center
252/260

Bio-based Gels & Porous Materials | Aero-, Cryo- & Xerogels

Cosponsored by AGFD, CARB, COLL, PMSE and POLY
Financially supported by EPNOE
F. Liebner, Organizer
T. Budtova, Organizer, Presiding
C. Freire, Presiding


8:30 440. Nanocellulose aerogels with thermal superinsulating properties obtained by spray freeze-drying. C. Jiménez-Saelices, B. Saentier, B. Cathala, Y. Grohens

8:55 441. Anisotropic cellulose ester aerogels with tunable mechanical properties via controlled solvent exchange. A. Tripathi, S.A. Khan, O.J. Rojas

9:20 442. 2,3-Dicarboxyl nano cellulose: A novel source material for transparent, birefringent and thermally superinsulating aerogels. S. Plappert, J. Nedelec, F. Liebner

9:45 Intermission.

10:00 443. Functional aerogels based on nanocellulose and platinum nanoparticles/graphene oxide for catalytic applications. R. Pinto, A.A. Silvestre, M. Simões, P. Marques, C. Freire

10:25 444. Fabrication of functionalized aerogels from cellulose and whole biomass for absorbing formaldehyde from indoor air. Y. Liao, X. Pan


11:15 446. Cellulose Aerogel Reinforced Polymers (CARPs). M. Schestakow, L. Ratke

Moscone Center
262

Reactive Extrusion: Advances at the Nexus of Polymer Processing, Materials Technology & Green Chemistry | Commercial & Versatile Technology
Cosponsored by MPPG‡ and POLY
L. A. Lucia, Organizer
A. Ayoub, Organizer, Presiding

8:00 Introductory Remarks.


8:30 448. Using reactive extrusion to manufacture greener products – from laboratory fundamentals to commercial scale. R. Narayan


9:45 Intermission.


10:25 451. Withdrawn

10:50 452. Thermomechanical extrusion preteatment for production of ethanol and arabinoxylan from corn fiber. G. Ryu


11:40 Concluding Remarks.

Moscone Center
270

Advances in Polysaccharides: Practice & Applications | New Functional Materials

Cosponsored by AGFD, CARB, MPPG‡, PMSE and POLY
H. Cheng, Organizer
A. Biswas, Organizer, Presiding


8:30 455. Chitin-Glucan nanopapers from fungi in membrane and water treatment operations. A. Mautner, N. Yousefi, W. Wan Nawawi, A. Bismarck
8:55 456. Cellulose functional materials with multiple stimuli responsive and their applications in sensors. **H. Kang**, P. Li, R. Liu, Y. Huang


9:45 Intermission.

10:00 458. Development of cellulose helicoidal architectures in nature. **S. Vignolini**


10:50 460. Structural features of polycarboxylic acids as crosslinking agents of cellulose. **G. Sun**, C. Zhao, H. Qi, B. Ji, K. Yan

11:15 461. PEGylation of chitosan via nitroxide chemistry in aqueous media. O. Garcia-Valdez, A. Darabi, M.F. Cunningham, **P. Champagne**

Moscone Center

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**Developments in the Fields of Celluloses & Lignocelluloses: In honor of Dr. Rajai Atalla**

Cosponsored by AGFD, ANYL and POLY
Financially supported by HORIBA Instruments Incorporated; University of Tokyo, Japan; Innventia AB; U.S. Forest Service
U. P. Agarwal, T. J. Elder, A. Isogai, Organizers
T. Larsson, Organizer, Presiding
Y. Hsieh, Presiding

8:00 Introductory Remarks.

8:05 462. New development of wood chemistry promoted by TOF-SIMS. D. Aoki, Y. Matsushita, K. Kuroda, **K. Fukushima**


9:45 Intermission.

10:25 467. Crystal deformation and transformation of cellulose allomorphs derived from stability of molecular chain sheets. T. Uto, T. Yui

10:50 468. Imaging mass spectrometry analysis of woody cell wall using $^{13}$CO$_2$ pulse labeling. M. Takeuchi, M. Norisada, A. Isogai

11:15 469. Withdrawn

Moscone Center
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Functional Lignocellulosics & Nanotechnology | Responsive Materials & Biosensors

Cosponsored by CARB and COLL
Financially supported by EPNOE
M. K. Ek, T. Nypelo, S. Peresin, Organizers
E. Filpponen, S. Spirk, Organizers, Presiding

8:05 470. First steps towards bio-based static true volumetric 3D displays: Transparent cellulose scaffolds equipped with photon upconverting rare earth metal doped nanophosphors (uc-NP). S. Quraishi, S. Plappert, T. Rosenau, F. Liebner


9:45 Intermission.

10:00 474. Withdrawn

10:25 475. Cellulose as a template for generation, wireless transport and storage of electrical energy with conducting polymers. S. Malti

10:50 476. Bacterial nanocellulose-based composites as ion exchange membranes for fuel cells. C. Vilela, A.A. Silvestre, F.M. Figueiredo, C.S. Freire

Moscone Center
276

**Valorization of Renewable Resources & Residuals into New Materials & Multiphase Systems**

Cosponsored by AGFD
J. Campos-Teran, O. J. Rojas, Organizers
M. L. Auad, Organizer, Presiding
R. L. Quirino, Presiding

8:00 Introductory Remarks.

8:05 478. Activated polysaccharide nanoparticles derived from xylan phenyl carbonates – From synthesis to applications. **M. Gericke**, L. Gabriel, K. Geitel, P. Trivedi, P.E. Fardim, T.J. Heinze

8:30 479. Emulsion polymerization of tung oil-based latexes with asolectin as a biorenewable surfactant. A. Johns, K. Edwards, S. Inglesby, **R.L. Quirino**


9:45 Intermission.

10:00 482. Green approaches to preparation of amphiphilic soy protein microfibrils and films. **X. Liu**, Y. Hsieh


10:50 484. Withdrawn

Moscone Center
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**Frontiers in Glycoanalytics | Molar Mass & Crystallinity Analyses**
Cosponsored by ANYL, CARB‡ and MPPG‡
Financially supported by Agilent Technologies; Bruker BioSpin Corporation; Postnova Analytics, Incorporated; Rigaku Corporation; Waters Corporation; Wyatt Technology Corporation
G. Boons, Organizer
M. Roman, Organizer, Presiding

8:10 Introductory Remarks.

8:15 485. Separation and characterization of polysaccharides by multi-detection size-exclusion chromatography and field-flow fractionation techniques. L. Pitkanen, A.M. Striegel

8:55 486. Determination of thickness, aspect ratio and size distribution of cellulose nanocrystals using asymmetric flow FFF and MALS. S. Tadjiki, R. Reed, M. Roman

9:20 487. Benefits of MALS, FFF and Viscometry in the characterization of polysaccharide molar mass, size, conformation and branching ratios. J.A. Ahlgren

9:45 Intermission.

10:00 488. Quantitating cellulose crystallinity: Approaches, problems, and perspectives. W.T. Winter

10:40 489. Simplified studies of cellulose crystallinity with a Rietveld program. A.D. French


11:30 491. Raman spectroscopy in the analysis of cellulose: Addressing the issues of crystallinity, polymorphy, and ultra-structure. U.P. Agarwal

THURSDAY AFTERNOON

Moscone Center
252/260

Bio-based Gels & Porous Materials | Open-Porous Carbon Materials

Cosponsored by AGFD, CARB, COLL, PMSE and POLY
Financially supported by EPNOE
T. Budtova, F. Liebner, Organizers
B. Cathala, Presiding

1:30 493. 3D interdigitated energy storage devices built inside aerogels using layer by layer assembly. **Z. Wang**, M. Hamedi, L. Wagberg

1:55 494. Processing and properties of elastomer covalently bound to nanocellulose aerogel. m. fumagalli, S. Boisseau, **L. Heux**


2:45 Intermission.

3:00 496. Withdrawn


4:15 499. Value-Added biomaterials from lignocellulose based on biorefinery scenario. **R. Sun**

4:40 Concluding Remarks.

Moscone Center
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**Reactive Extrusion: Advances at the Nexus of Polymer Processing, Materials Technology & Green Chemistry | Energy, Food & Packaging Development**

Cosponsored by MPPG‡ and POLY
L. A. Lucia, Organizer
A. Ayoub, Organizer, Presiding

1:00 Introductory Remarks.

1:05 500. Melt extrusion of lignin carbon-fiber precursors: The path forward for low-cost fibers or unrealizable dream? **D.P. Harper**, O. Hosseinaei

1:55 502. Rheology and modeling of complex food systems in reactive extrusion. M. Emin, H. Schuchmann

2:20 503. Polymerization of sugars by reactive twin-screw extrusion to produce soluble fibers for food and feed. T.C. Schoenfuss, A. Kuechel, C. Tyl

2:45 Intermission.

3:00 504. Advanced thermal analysis modelling for the characterization of active poly(lactic acid)/natural fibre food-packaging composite materials. S.W. Bigger, M.J. Cran, I.S. Tawakkal


3:50 506. Withdrawn

4:15 507. Preparation of water soluble oligosaccharides from sugar reversion reactions in acidic lithium bromide trihydrate. N. Li, X. Pan

4:40 Concluding Remarks.

Section C

Moscone Center
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Advances in Polysaccharides: Practice & Applications | Preparation, Characterization & Applications

Cosponsored by AGFD, CARB, MPPG‡, PMSE and POLY
A. Biswas, H. Cheng, Organizers
H. Cheng, R. Furtado, Presiding

1:05 508. Gradient separations and two-dimensional separations of cellulose derivatives. W. Radke

1:30 509. New insight into the gelation of Na-alginate aqueous solution. R. Liu, C. Zhao, K. Sui, Y. Xia


2:45 Intermission.
3:00 512. Use of polysaccharides from cashew gum in encapsulation applications. R. Furtado, L.C. Silva, M.A. Nascimento, L.G. Mendes, T.L. Barroso, G.A. Freire


4:15 Concluding Remarks.

Moscone Center
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Developments in the Fields of Celluloses & Lignocelluloses: In honor of Dr. Rajai Atalla

Cosponsored by AGFD, ANYL and POLY
Financially supported by HORIBA Instruments Incorporated; University of Tokyo, Japan; Innventia AB; U.S. Forest Service
U. P. Agarwal, T. J. Elder, T. Larsson, Organizers
A. Isogai, Organizer, Presiding

1:00 Introductory Remarks.

1:05 515. In situ Raman Microscopy to monitor changes in cellulose crystallinity during acid pre-treatment. M.T. Timko

1:30 516. On the ionization of cellulose in aqueous alkali. D. Bernin, E. Bialik, B. Stenqvist, Y. Fang, Å. Östlund, I. Furo, B. Lindman, M. Lund


2:20 518. Effect of dilution-freezing-drying process on Cellulose Nanocrystals (CNCs) for Polylactic Acid (PLA)-CNC composite packaging. N. Stark, R. Sabo, L. Wei, R. Reiner, A. Rudie

2:45 Intermission.


Section E
Moscone Center
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**Functional Lignocellulosics & Nanotechnology | (nano)Paper: From Fundamentals to Applications/Antimicrobial, Functional Materials**

Cosponsored by CARB and COLL
Financially supported by EPNOE
M. K. Ek, E. Filpponen, T. Nypelo, S. Peresin, **Organizers**
S. Spirk, **Organizer, Presiding**
W. Fischer, **Presiding**

1:05 523. Microfluidic paper - influence of fiber source, sheet properties and fiber surface modification on capillary driven flow. **M.A. Biesalski**, A. Böhm, S. Wendenburg


2:45 Intermission.


4:15 530. Film formation and performance of different nanocelluloses obtained from different cellulose sources after different preparation processes. Y. Zhao, C. Moser, M.E. Lindström, G. Henriksson, J. Li

valorization of renewable resources & residuals into new materials & multiphase systems

cosponsored by AGFD
M. L. Auad, J. Campos-Teran, Organizers
O. J. Rojas, Organizer, Presiding
A. Villares, Presiding

1:00 Introductory Remarks.

1:05 531. Cellulose nanofibrils in emulsions stabilized by an ionic surfactant and effect of electrolyte in phase transitions. S. Huan, S. Yokota, M. Ago, M. Borghei, T. Kondo, O.J. Rojas

1:30 532. In situ biomineralization of hydroxyapatite on bacterial nanocellulose and use as bioink for 3D bioprinting scaffolds to engineer bone. G. Toriz Gonzalez, P. Gatenholm


2:45 Intermission.

3:00 535. Withdrawn

3:25 536. Mechanical isolation of nanocellulose from paper industry waste by ball mining. D. Rosa, F. Kano, A. Souza

3:50 537. Chemical isolation and characterization of cellulose nanofibers to produce bionanocomposite films onto chitosan matrix for seafood packaging. B. Soni