13. A NOVEL METHOD FOR ANALYSIS OF XANTHATE GROUP DISTRIBUTION IN VISCOSES AXEL RUSSLER . [ET AL.] pdf

1: www.enganchecubano.com: Alternative Cellulose Conference â€“ TITK Rudolstadt 5th -7th September

In a four-years' endeavor in our lab, a method is being developed which allows to analyze the distribution of xanthate groups in viscoses relative to the anhydroglucose units and along the cellulose chain.

Eine Methode zur Ermittlung der Substituentenverteilung in Viskosen. Die Werkstoffliche Nutzung nachwachsender Rohstoffe, Septe. Preparation and alkaline degradation of model compounds related to branched xylan. Efficient synthesis of chlamydial tetra- and pentaacyl lipid A. Synthetic and biosynthetic studies of nucleotide-activated glycero-D-mann-heptoses. Advances in Chemistry and Analysis of Cellulose. Chemical and biosynthetic studies of nucleotide-activated D-glycero-D-manno-heptoses. A novel method for the determination of carbonyl functions in cellulosic substrates.. Carbonylgruppenbestimmung in cellulosischen Substraten. Synthesis and oxidation behavior of 2,4,5,7,8-pentamethyl-4H-1,3-benzodioxinol, a multi-functional oxa-tocopherol type antioxidant.. The chemistry of the Lyocell process. Cellooligosaccharides - separation by capillary electrophoresis and reactions kinetics under alkaline conditions.. Synthesis of protected chlamydial tetra- and pentaacyl lipid A derivatives. Abstracts 11th European Carbohydrate Symposium, B, p Novel methods to determine carbonyl functions in cellulosic substrates.. Studies towards an accurate determination of carbonyl functions in cellulosic substrates.. Studies towards an accurate method for the determination of oxidized structures in cellulose. Tocopherol derivatives oxidized at the pyran ring structure.. Abstracts, Zellcheming , Baden-Baden, Sept. Chemistry and Kinetics of the Laccase-Mediator system.. Synthesis of RNA-group I specific Pseudomonas aeruginosa lipopolysaccharide core antigens containing 7-O-carbamoyl-L-glycero-D-manno-heptopyranosyl residues.

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2: Determination of substituent distribution of viscoses by GPC | axel russler - www.enganchecubano.com

Analytical monitoring of xanthation in the viscose process along with xanthate group analysis in the viscose material is a long-debated problem in cellulose chemistry.

Nonwovens will be affected. The annual increase in population is equivalent to a new country the size of Germany while annual soil degradation means an area the size of Germany becomes unproductive desert. Food production is declining and the rate of loss of species, especially marine species means the natural food chain diminishes. Our only hope is that humanity is intelligent enough to deal with the problems it has caused by moving rapidly replacing growth targets with sustainability targets. Future sustainable products should optimise the use of renewable resources and be designed for multiple uses through recycling while being flexible, adaptable and intended for long-life. Asked if the main solutions to the environmental problems were all technological, Dr Strigl said that on the contrary, changes in lifestyle were the key. It is a sachet of chemicals which coagulates, flocculates and precipitates any contamination in water and disinfects the remainder. It has proved effective against bacteria, viruses, parasites, and heavy metals such as arsenic. Population Services International, in the countries with clean water problems, to educate consumers, especially the women and children who prove keen to spread the word about the new product. Where major quantities of clean water are needed centrally, PuR is available in bulk for use in water purification plants. Asked what happens to the sludge filtered out after water purification, Dr Franke said it could be disposed of in normal household waste. Simonetta Carbonaro of Realise Strategic Consultants felt the days of continuously increasing consumption and growth had ended in the West and started in the East. There was too much choice. Products would need top-class design combined with an ethical commitment. Care and Excellence would be the watchwords. Consumers would buy fewer excellent products, financial growth coming from premium pricing not volumes sold. Discounters would nevertheless have a place, providing the essentials of life, but would have to deliver excellent value uncluttered with fairytale marketing. The mid-range products and retailers would have a problem as consumers deserted this territory. Maybe the oriental Souk would become the model for Western retailing: Health and Wellness Ethan Sinick, VP Europe for Management Ventures Inc UK argued that the proliferation of wellness food marketing from the major retailers will create a demand for similar offerings in the hygiene sector. This Whole Foods effect is expected to spread, but in addition to Health and Wellness, consumers will expect products to be Ethical. Loyalty will be built around high quality fresh food but these stores will have to extend the concept into Fair Trade products including organic clothing, beauty products and hygiene products. Tesco for example have acquired Nutri-Centre and are creating sections for this brand in their stores. These trends will affect nonwovens. Disposables producers may have to stop adding ever-greater functionality and switch emphasis to lifestyle benefits, offering acceptable performance with the right ethical positioning. Biodegradable products could benefit from this although it is unclear whether or not the disposable diaper could tolerate reduced performance. Cotton-based products could also benefit, particularly if the cotton is organic. Sales of the current niche products should be watched for clues of consumer attitudes here. The Role of Private Equity Paul Zowett of LEK Consulting Germany said the relatively non-cyclical and entrepreneurial nature of the nonwovens industry made it an attractive target for Private Equity Houses who were keen to lend money to allow higher cash-flows to be generated. Should nonwovens producers see Private Equity as a threat? Mr Zowett thought not: The passive financing of the past was becoming the active financing of the future, and PE was leading this trend to active shareholders. Even pension funds were now getting concerned about their shareholdings and try to become more active in managing them. The fit between management and finance, at its tightest in PE buy-outs would generally increase. A questioner pointed out that PE tended to deconcentrate and industry, going against the trend for mergers and economies of scale. Mr Zowett commented that the rapidly increasing scale of nonwovens production machinery offered by the Reicofils of the world meant that

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the industry had to restructure regularly, and invest more in the process. PE could help with this. Furthermore he thought mergers creating global mega-producers are less than ideal when the product is hard to ship. Production needs to be from efficient plants close to the market like Pegas. Was there a clash between PE and Sustainability? No, sustainable products that worked would be a goldmine â€" and PE could develop these as well as any. Known reserves are diminishing, exploration costs are increasing, and the oil producing regions are increasingly unstable politically. The only way is up. Anyone at Shell can post ideas on the internal website and the Team reviews and screens these ideas regularly, selecting a few to move forward to the feasibility study stage of a stage-gate new product development process. External ideas are also welcomed on an external website www. In response to a question, Mr Bol said the vast Canadian tar-sands can be mined open cast , the oil extracted and clean sand returned. At current oil price this would be economical. Oil extraction was all about manipulating wettability so maybe Shell could learn from hygiene products. Career development by sticking with and growing with their project is encouraged. The submission of 3 business models for any idea, one of these being immediate licensing, is mandatory. Key elements of the 3M innovation process are:

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3: University of Natural Resources and Life Sciences, Vienna (BOKU) - Research portal

A Novel Method for Analysis of Xanthate Group Distribution in Viscoses Axel RuÃŸler University of Natural Resources and Applied Life Sciences, Christianâ€•Dopplerâ€•Laboratory and Department of Chemistry, Muthgasse 18, A - Vienna, Austria, Fax: (+43) 1

Axel Russler Article in press - uncorrected proof Holzforschung, Vol. Its yellow color originates from side products Technology of Wood, Federal Research Center for such as trithiocarbonates and vinylenetrithiocarbonate. After a ripening step used to and Applied Life Sciences Vienna, Muthgasse 18, A adjust the colloid-chemical state to the requirements of Vienna, Austria appropriate spinnability, the xanthate is filtered and spun Fax: The major obstacle in analysis of the intermediate xan- thate is its instability. Classical analysis comprises esti- Abstract mation of the grade of ripening by the Hottenroth procedure and determination of the degree of substitu- Based on previous investigations on the substitution pat- tion DS by titration or FTIR Fink et al. The limited stability, the poor state of solution, and were analyzed by gel permeation chromatography GPC the high alkalinity make gel permeation chromatography with multiple-angle laser light scattering, refractive index GPC analysis extremely difficult. Hence, we searched RI , and UV detection. Viscoses derivatized with N-meth- for a more convenient way to analyze viscose and to yl-N-phenyl-iodoacetanilide are stable over a long time determine not only the molecular weight, but also the and largely improve handling for analytical purposes. In distribution of xanthate groups over the whole molecular- addition, the derivatized xanthogenate groups exhibit UV weight range. UV assay indicated that in technical viscoses the roacetamide was performed to increase the stability of distribution of substituents is uniform. Enzymatic degra- the xanthate groups Fink et al. Even though the degree duction of iodoacetanilide derivatives into viscose anal- of substitution DS of xanthogenate groups ranged from ysis, which exhibit superior stability and solubility, along gs0. Ultrasonic degradation resulted in Importantly, derivatization of viscose samples can be a narrow molecular weight distribution MWD , notably carried out without loss of xanthate groups, so that the without cleavage of substituents, and was also used to distribution pattern of the stabilized viscose truly reflects improve the solubility of the stabilized viscoses for further that of the original material. The techniques applied provide more insight With regard to the substituent distribution, three differ- into the xanthogenate distribution along the MWD. Every structural level strongly influ- degradation; xanthogenate. The temperature- and pH-dependent instability of the Introduction xanthate group is the main reason why there is still a requirement to improve the analysis. Moreover, many The viscose process, discovered by Cross, Bevan, and theories still remain controversial. Changes in the distri- Beadle in Cross et al. Even though this pro- substituent profiles over the molecular mass distribution Article in press - uncorrected proof 2 A. Figure 1 Different structural levels of substitution on cellulose. MWD have been studied, especially with regard to after thawing. Viscoses and derivatives were generally stored at changes during aging Philipp and Dautzenberg ; yC. The chemical characteristics of the products are given Goldberg et al. The theory of in Table 1. Most of the relevant experiments were not was used as the eluant. The sample was injected automatically, performed on industrial viscoses, but on samples spe- chromatographed on four serial GPC columns and monitored by cially prepared in laboratories. The MWD and related polymer parameters produced viscoses. Making use of a stabilization reaction were calculated by software programs based on a refractive that provides stable and soluble viscose derivatives, we index increment of 0. Chemicals Chemicals were obtained from commercial sources and were of GPC system aqueous the highest purity available. Data were evaluated as for the organic yC or yC and subjected to the stabilization reaction GPC system. Aging Aging was simply performed by storing fresh viscose at C for 24 or 48 h, respectively, before stabilization. Longer aging periods are difficult to handle because the viscose starts to coagulate and subsequent derivatization is complicated. The concentration of stabilized viscoses was 5 mg mly1, similar to the concentration used in GPC. To isolate ultra- sonically treated samples, the treatment was performed as

further purification and to achieve a better texture, the above, but in pure DMAc as solvent and reprecipitation was per- stabilized polymer was dissolved in DMAc and subse- formed as in the purification step after viscose stabilization. The samples were then filtered, Enzyme treatment washed with the same solution and dried under vacuum. Sephadex G medium Amersham Biosciences to separate For determination of the g-value, direct measurement the protein from fermentation sugars. To avoid contami- The spectroscopic characteristics allow measurement of nation of the polymer, the enzyme concentration was not further the UV signal at nm, since DMAc has a UV cut-off increased and no buffer was used. The reaction was stopped by freezing and subsequent freeze-drying. For further purification, at nm. Figure 3 shows a comparison of the MWD of stabilized Results and discussion and the corresponding regenerated cellulose. Article in press - uncorrected proof 4 A. Table 2 Selected properties of the viscoses investigated. The MW shift can exclusively be ascribed to the A crucial issue in this regard is the accurate determi- additional weight of the stabilized xanthate substituents nation of the delay between different detectors in the Table 2. We found bovine serum ular weight data. The dissolved polymers â€" both xanthate and In the literature, only two papers dealing with the dis- pure cellulose â€" behaved partly like a polyelectrolyte, tribution of xanthate groups in viscose are available causing Li ion gradients with preferential solvation of the Fischer et al. The authors analyzed the DS polymer molecules, even if the polymer itself carries no of viscoses as a function of the MWD by direct analysis charge. To circumvent this problem, the sample is nor- of fresh viscose in sodium hydroxide. Both meth- In contrast, our studies clearly demonstrated a uniform ods have disadvantages: The slight changes in the bulk MW region mass recovery, which is hardly achieved. The success are within the measurement error. To ensure that changes also depends on factors such as column conditioning in the DS distribution are not caused by the derivatization and age. Figure 4 shows the corresponding to cellulose measured in a similar manner. Both viscoses, UV and RI traces. Both signals were evidently congruent, sample A with DSs0. For comparison, the value obtained for cel- gated. As in the case of cellulose, val- At low and very high MW values, i. We used the same value throughout this work for stabilized viscoses with different DS values, as our measurements had shown that the values for both stabilized viscoses and cellulose were nearly equal. The intensity of the signal must be calibrated either with sam- ples of known DS or with low-molecular-weight stan- dards exhibiting the same spectroscopic characteristics. Article in press - uncorrected proof Substituent distribution of viscoses by GPC 5 Treatment with endoglucanases indeed yielded low- MW fragments, which could be detected both by their RI and UV signals. While both signals were congruent for untreated samples, changes were visible in the enzyme- treated samples. The overall changes observed for sam- ple A were not as distinct; only slight degradation of the high-MW fraction occurred. This was in agreement with the general DS distribution for the two viscoses: In addition to the differences between the low-MW fragments, enzyme-treated sample B had a higher UV response in the region of the high-MW shoulder that was not com- mensurate with the RI signal. Evidently, non-substituted cellulose structures were degraded â€" hence the drop in RI response â€" while substituted structures were retained, causing the observed UV signal. Degradation of the high- MW fraction was much more pronounced for sample B Figure 5 Distributions of degree of substitution DS and molecular weight distribution MWD of fresh and aged stabilized sample B top and sample A viscoses. However, while sample A showed an even DS distribution in these low- and high-MW regions, the higher substituted sample B exhibited a rather steep DS drop in these regions. Aging of sample B 24 and 48 h at room temperature slightly leveled out the differ- ences observed in the area of low and high MW values. For sample A, the DS distribution did not change signif- icantly upon aging and no shift to either side of the MWD was observed. The differences observed for the low- and very high-MW fragments between samples A and B are also reflected by the results of enzymatic treatment, as discussed in the next section. Although the outcome appeared quite consistent, it remains to be verified whether an even substitution pattern is a feature of industrial viscoses, whether different distribution patterns may be found in specially prepared cellulose xanthates, and if differences observed for the high- and low-MW regions for higher substituted viscoses are a common characteristic. Degradation by endoglucanases To obtain a greater insight into the substituent

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distribu- tion along the chains, enzymatic degradation of the sta- bilized viscose polymer was carried out. As the degradation ability of the enzyme was likely to be influ- enced by the number of substituents, the degradation pattern was expected to provide information on the intra- Figure 6 GPC analysis of enzymatically treated stabilized vis- molecular homogeneity of the substitution. Article in press - uncorrected proof 6 A. Hence, the endoglucanase treatments indicated differ- ent substitution characteristics, both between samples A and B and between different MW regions of the respec- tive samples. Degradation by ultrasound The state of dissolution of stabilized viscoses seemed to be sufficient for GPC measurements. However, other analytical techniques, such as liquid NMR, often exhibit better resolution if the polymer is degraded to some extent, without losing the substituent characteristics. Quite often, ultrasonic treatment of polymers results not only in a reduction in the molecular weight, but also in changes in the polymer structure and its substituents. The substituents of the stabilized viscose, however, proved to be very stable towards ultrasonic treatment. Since the sample was directly injected into GPC columns after ultrasonic treatment for up to 7 h, a loss of xanthate substituents would have been readily visible, especially in the low MW region of the UV signal Figure 7. Soni- cation resulted in a non-significant reduction in the molecular weight Figure 9. Cleavage in the middle of the molecular chain is preferred and degradation results in a definite minimum chain length Czechowska-Biskup et al. Eventually, this results in a more even distribution of the molecular weight fractions Figure 8. Ultrasonic degradation is driven by forces in elongational flow fields Figure 8 GPC analysis of ultrasonically treated stabilized sam- between collapsing bubbles cavitations. Other compet- ple A and sample B viscoses; arrows show the direction of MW itive mechanisms, such as radical-induced degradation degradation. In addition, the DS profile MW exhibited an exponential decay. Both curves in Fig- along the MWD did not show any changes during ultra- ure 9 reveal similar decay characteristics, but start and sonic treatment. These results are in good accord with end at different levels. These authors found radation. Unlike in the case of enzymatically degraded polymers, no low-MW fragments complicate the spectra Figure 7 UV spectra of stabilized viscoses treated with ultra- sound for 7 h: Article in press - uncorrected proof Substituent distribution of viscoses by GPC 7 by end group effects, while the state of solvation is Fischer, K. The stability of the derivatized viscose also Garegg, P. Results of the NMR nuclear magnetic resonance Part 3. The distribution of sub- measurements will be reported elsewhere. Chemiefasern nach dem Viskoseverfahren. Springer- different stabilized and fresh viscoses. Treatment of sta- Verlag, Berlin, Acta insights into the characteristics of the substituent distri- Generally, an even Hottenroth, V. Chemie- distribution over the MW fractions was found for the fasern nach dem Viskoseverfahren.

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4: Dr. Elena Berger-Nicoletti | Frey Research Group

In a four-years' endeavor in our lab, a method is being developed which allows to analyze the distribution of xanthate groups in viscoses relative to the anhydroglucose units and along the.

Also further treatments homogeneity of the substituent like ultrasonic or enzymatic degradation distribution. By SEC in combination with viscose detecting the samples in SEC by RI and stabilisation is also suitable for tracking UV detectors, the substituent transxanthation reactions within the distribution over the molecular weight viscose dope. Analyzed viscose samples showed relatively Keywords: Most changes in the Beadle, the viscose process has a long substituent distribution occur by different history. The transformation of unspinable reactions during the ripening step of the wood cellulose into a spinable form by the dissolved cellulose xanthate. Well known intermediate cellulose xanthate has been are the decrease of the DS and the used during this long time to provide a colloidchemical modifications of the broad variety of fibers with different polymer during this step. However after some years of distribution. These over the major part of the MWD with only drawbacks for sophisticated analysis slight changes that are within the error of methods could be overcome by alkylation. For this purpose a stabilisation reaction Problems for interpretation of the signals with N-Methyl-N-phenyliodoacetamide can arise at low and very high MW values, is suitable as reported elsewhere [1]. The signals can not be totally synchronized due to SEC analysis diffusion phenomena within the link of the Stabilized cellulose xanthate could be RI and the UV detector. Together with the directly applied for size exclusion low concentration in these areas and the chromatography. It is readily soluble in differences in sensitivity of the two standard solvents for polymer SEC like detectors the very edges of the distribution dimethyl sulfoxide or dimethyl acetamide. RI-signal and gamma value distribution on freshly stabilized viskoses A: This could be proved by a direct in the main region of the MWD significant SEC analysis of a ultrasonically degraded differences are detectable. Enzyme-treated stabilized viscose sample where no cleaved sample B showed a higher UV-response in substituents could be found see Figure 3. Evidently, non-substituted cellulose like e. This is structures were degraded â€” hence the drop very desirable in spectroscopic analysis in RI response â€” while substituted due to reduced end group effects and for structures were retained causing the further chemical reactions to minimize observed UV signal. The degradation of substance losses in precipitation steps. Hence, the its homgeneity. Both main peak and the peaks of the degradation samples were degradable with the products shows the same pattern see preparation. This proves the signals to be of The chromatograms see Figure 4 show the same origin and not a contamination different degradation patterns of the two for instance by the enzyme. SEC analysis of an ultrasonically Figure 3. UV spectra of SEC of stabilized treated stabilized viscose samples viscoses treated with ultrasound with treatment times: Transxanthation reactions The transxanthation reactions, leading to a viscose is diluted, filtrated and more homogeneous substitution are still subsequently stabilized. If transxanthation not fully understood and especially not occurs the UV profiles of the SEC acquired concerning their amount during separation change and an increase in the ripening of the viscose []. In combination with the intermolecular transxanthation reactions RI profiles the amount of transxanthation occurring in the viscose dope. For this purpose a fresh high molecular Results of this assay will be presented in mass viscose is mixed with a low detail elsewhere. SEC analysis showed a Improved NMR characterization of relatively homogeneous substituent high-molecular-weight polymers distribution over the main part of the and polyelectrolytes through the molecular weight distribution. The use of preliminary ultrasonic polymer is also accessible to ultrasonic and degradation. Die Makromolekulare enzymatic degradation without loss of Chemie , , 3 , An enzymatic degradation [4] Czechowska-Biskup, R. Method for Analysis of Xanthate Textiltech. Group Distribution in Viscoses. Producing homologous series of Textiltech. Studies of with the aid of ultrasonic Cellulose Xanthate. Macromolecules , 2, 2 , Phys.

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5: Report Department for Chemistry - PDF

Article in press - uncorrected proof Substituent distribution of viscoses by GPC 7 by end group effects, while the state of solvation is Fischer, K., Krasselt, K., Schmidt, I., Weightman, D. () Dis- improved by the selective degradation of poorly soluble tribution of substituents along the cellulose chain on cellu- lose xanthate and.

Ionic liquids for biomass processing - Characterization and Utilization. Science and Technology of Biomasses: Hochdruckverfahren zur Nutzung von Lignocellulose als nachwachsender Rohstoff oder Energiequelle. Supercritical carbon dioxide in the field of biomaterials: Aerogels from Bacterial Cellulose: A new dimension in preparing shaped cellulosic aerogels. Dimensional stability of shaped cellulose aerogels depending on moisture content. Supercritical CO2 processes for the production of new materials from natural carbohydrate polymers.. Utilization of ligneous waste materials for sustainable rehabilitation of degraded soils. Separation processes for the utilisation of lignocellulose as renewable resource for energy, materials and chemicals.. Synthesis of gold nanoparticles for in situ glyoc-conjugation in the NMMO system.. Cellulose-Aerogele, ein neues Biomaterial. Inhibition of mammalian cytochrome bc1 complex by chromanols and related compounds.. Highly porous, ultralightweight biomaterials.. Activation and sequestration of carbon dioxide â€" two joint processes in soil chemistry?. Cellulosic Aerogels as Novel, Ultra-lightweight Biomaterials.. Aldonic acid production by a coupled enzyme system.. Control and exploitation of enzymes for added-value products. Production of aldonic acids by cellobiose dehydrogenase.. Analysis of mechanically peeled unbleached and bleached kraft pulp fibre wall surface layers. Advances in Chemistry and Analytics of Cellulose. International pulp bleaching conference. Studies on DMSO-containing carbanilation mixtures: Chemistry, oxidations and cellulose integrity.. Synthesis of isotopically labeled cellulose solvents.. Spin adducts formed from different carbamoyl-substituted EMPO derivatives.. Does cellulose integrity suffer from DMSO containing carbaniliation mixtures?. Mechanistic studies and application perspectives of a novel reaction.. Advances in the characterization of cellulosics: Isolation and identification of chromophors from cellulosic material. Wiesenberger, Thomas Rosenau, Lars Gille Synthesis of isotopically labelled cellulose solvents for NMR studies. Synthesis of isotopically labelled cellulose solvents for NMR studies.. Studies on oxidative modifications of cellulose by the periodate oxidation. Model compound studies into the mechanism of the Organosolv pulping process. Synthesis of hexenuronic acid model compounds.. Spin adduct formation from different methyl- and ethyl-substituted EMPO-derivatives and toxicity measurements using cultured cells. Formation of free radical adducts from different ethyl-substituted EMPO-derivatives.. Cellulosic aerogels as novel biomaterials from solvent-extracted and supercritically dried Lyocell dopes. Neue Biomaterialien mit interessanten Eigenschaften. September , Erfurt Patel, I. Production and immobilization of laccase for biotransformations in organic solvents. Isolation and identification of residual chromophores from cellulosic materials.. Suess, Norbert Nimmerfroh Chromophores in cellulosic material: Isolation and identification of chromophors from bleached and aged pulps.. Synthesis of isotopically labelled cellulose model compounds.. Synthesis of novel cellodextrins as cellulosic model compounds. Preparation of high-value compounds from xylan: Isolation and identification of residual chromophores from cellulosic material. Approaches for new methods in Analysis of cellulose xanthate substituents. Analysis of substituent distributions in viscose. Synthesis of chito-dodecaose by polymerization of a starting chitobiose derivative. Isolation, synthesis and derivatization of xylodextrins. Juni, Wiesbaden Bohrn, R. A novel approach towards the analysis of carboxyl groups in cellulosic substrates. Determination of functional groups in cellulosic substrates: A novel diazo reagent for the fluorescence labeling of carboxyl groups. Investigation of aldose oxidation in acidic bisulfite pulps. Analysis of functional groups in cellulosics. Juni, Wiesbaden Rosenau, T. Novel aspects in vitamin E chemistry: Two novel tools in cellulose analytics. A novel approach to assess xanthate group distribution in viscose.

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6: BOKU - UniversitÃ¤t fÃ¼r Bodenkultur Wien - Forschungsinformationssystem

A Novel Method for Analysis of Xanthate Group Distribution in Viscoses more by axel russler Analytical monitoring of xanthation in the viscose process along with xanthate group analysis in the viscose material is a long-debated problem in cellulose chemistry.

The costs of ionic liquids and the relative complexity of their recycling remain as problems to be solved, but the process appears able to use lyocell hardware without the need to design for explosion venting. This and the higher cellulose concentration which appear possible will reduce capital and operating costs. Photographs of the highly flexible and elastic sheets, said to be tearproof and absolutely pure were impressive in vetinary and cosmetic applications. A 2cm thick growth of cellulose is obtained on the surface of the beaker after 20 days and at this point growth stops. However changing to a conical flask and spraying the surface with an aerosol of glucose appears to allow thickness only limited by the depth of the culture medium 10 cms to be obtained. A bioreactor pilot plant has now been developed and this produces a 7 cm thick cellulose gel in 40 days by virtue of aerosol glucose spraying and constant removal of the cellulose gel. Each bacteria resides in the reactor for 0. Disintegration and fast dissolution High swelling ballooning then dissolution Ballooning without dissolution No visible effects In the lyocell process modes are observed. However in this case, complete dissolution of cellulose occurs inside the cuticle which forms the balloon and it is only this membrane which prevents the fiber disappearing completely. Enzymatic degradation of the cuticle of the fiber prior to contact with the caustic results in complete dissolution in NaOH â€" this being the basis of Biocelsol see later. So, it is easier to dissolve the crystalline regions than it is to dissolve the outer membrane of a cellulose fiber. Interestingly, highly-tensioned fibers do not dissolve in NMMO, but at low tensions, dissolution occurs without ballooning. The same modes of dissolution have been observed in non-aqueous solvents e. Solid state NMR was used to measure fibril and fibril aggregate size changes when pulps of different purity Acacia and Eucalyptus were made bleached and unbleached and dryed in the lab or in the factory. Acacia gave higher fibril aggregate size than eucalyptus Bleaching increased aggregation presumably due to the removal of hemicellulose and lignin Air-drying increased aggregate size irreversibly. None of the extracting agents was equally well suited for all 4 pulp types. None of the tested extracting agents was suitable for softwood kraft pulp. Dr Puls concluded that hardwood paper pulps could be converted to dissolving pulps with high alpha-cellulose content. Could Nitren be recycled efficiently? Yes, and the xylan it extracts can also be sold. Is there any nickel left in the pulp? Yes, 10ppm and this is acceptable. There is no nickel in the waste water from the process. Biocelsol viscose blends A. Marcinin of the Department of Fiber and Textile Chemistry at the Slovak University of Technology has been investigating the rheology of soda-solutions of enzyme-treated wood pulps â€" Biocelsol â€" and how they blend with viscose. Films cast from the blends showed decreasing strength as PLI increased the more viscose the better Conclusion? Biocelsol solutions are heterogeneous and spoil the structure of a cellulose film. Biocelsol Multifilament Yarns Ewa Wesolowska of the Institute of Biopolymers and Chemical Fibers Poland presented studies aimed at optimizing the Biocelsol dissolution process and the yarn spinning process. Zinc Oxide had to be added to the dissolving soda to improve the dissolution of the higher DP fractions above â€" Sulphite Pulp from Finland 3 o C was the best dissolution temperature but even at this temperature, the viscosity increased from 70 to 95 ball-fall seconds between 50 and minutes mixing times Filterability of these solutions became acceptable after about mins mixing K-value falls below and undissolved pulp below 0. Wet property results were unavailable, but the consensus clearly felt they would not be good. Cellulose Beads for Biomedical Use Peter Rosenberg of the Abo Akademi University Finland described how cellulose beads could be produced by feeding viscose or Biocelsol dope onto a spinning disc atomizer which sprayed droplets onto a sulphuric acid bath. Ovoid bead sizes between 0. Viscose dope gave bigger beads and tighter bead-size distributions than Biocelsol. However Biocelsol beads showed slightly better flowability. Overall, Dr Rosenberg concluded that Biocelsol beads could replace

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viscose beads and would benefit from the xanthate-free process in his applications â€" mainly tablet fillers. Asked if zinc residues from the Biocelsol dope would be a problem he thought maybe they would. Unfortunately the spin bath suphuric acid and either ammonium or sodium sulphate tends to dissolve out some of the silk so actual levels obtained were about Nonwovens had been made by blending wet Bio-modified cellulose enzyme treated pulp? She could not describe the laying process suspect they were hand-made Ed. Analysis of Cellulose Xanthate Dr Axel Russler of Lenzing Austria has been trying to elucidate the structure of cellulose xanthate in viscose so that a better understanding the redistribution of the xanthate groups on the cellulose chain during ageing is obtained. Techniques used involve stabilizing the xanthate and then replacing the xanthate groups with other groups which can be more easily analysed with NMR and GPC. For example direct methylation of a stabilized xanthate replaced the un-xanthated hydroxyls on the chain with methyl groups, and the xanthate groups with hydroxyl. Acetylation of this created the acetylated MeO-glucitole whose structure reflected that of the original stabilized xanthate and could be determined by GPC. Andreas Koschella of the Center for Excellence for Polysaccharide Research at the Friedrich Schiller University of Jena Germany gave the current production of cellulose ester and ethers: If esterification or etherification could be carried out regio-selectively, i. Dr Koschella concluded that regioselective functionalization is still a great challenge but progress is being made by protecting the primary OH group by triphenylmethylation or silylation and the secondary OH group at position 2 by silylation. This can allow either 2,3-O- Derivates and 3-O-Derivatives to be made controllably. Magnetic Cellulose Fibers Dr Bernd Halbedel of Ilmenau Technical University Germany is developing flexible magnetic sensors and microwave absorbing materials from fibers containing barium hexaferrite. For magnetic applications, the barium hexferrite powder is heat-treated at above o C for 2 hours or more and can then be added to lyocell dope and converted into fibers with diameters between 15 micron and 1. For microwave applications the barium hexaferrite needs doping with cobalt or titanium before it absorbs in the GHz range. These powders can be added at filling ratios of up to 1: BHF and the fibers need to be in the form of 2mm thick fleeces to work. Sheath core bicomponents are preferred so that the highly filled core is protected by a sheath of pure cellulose giving a fiber with an average fill ratio of 1: For monocomponent fibers with a diameter of 1. Unsurprisingly, magnetic attraction between the BHF particles causes agglomeration and this is a problem to be solved. It was just a glue and other polymers may work as well. Calvin Woodings - 13 th September.

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In particular, the appointment of Thomas Rosenau for the chair of Wood-, Pulp- and Fibre Chemistry will focus research activities towards Green Chemistry and sustainable use of renewable resources. The further development of this field will strongly benefit from the new facilities to be established at the University Research Centre Tulln UFT. Several highlights of the past three years should be mentioned: In addition to the strong position of the department in receiving competitive FWF funding for basic research, cooperation with industrial partners has also been expanded Bridge-program, Vienna Spot of Excellence program, EC-projects. The past three years have also seen a strong increase in student numbers, especially in the study programs of food- and biotechnology leading to enormous teaching loads for the department staff. The situation has been attenuated by the university administration by funding one teaching assistant and will be further improved with additional lab space for biochemistry courses in New courses and lectures have been implemented for several of the bachelor and master study programs and initiatives have been started for international master curricula. Last but not least I take the opportunity to thank all people and institutions both within and outside the University for continuous support and assistance providing the essential basis for successful future work and development. Paul Kosma Deputy Directors: Christian Obinger Office of the Department Administration: Zoderer Martina Kneisz Luzia Teaching assistants: Christina Haberhauer-Troyer part time Dipl. Manfred Schwanninger part time Laboratory assistants: Martin Gutternigg part time Ao. Erika Staudacher part time Ao. Alla Zamyatina part time Univ. Antje Potthast, part time Vert. Christian Obinger Full professors O. Thomas Rosenau Associate professors Ao. Antje Potthast, part time Ao. Wilson Assistant professors Univ. Edit Balla, part time Univ. Martin Gutternigg, part time Dipl. Christina Haberhauer-Troyer, part time Univ. Ute Hennings, part time Ass. Manfred Schwanninger, part time Univ. Thomas Dalik Maria Hobel Ing. Beatriz Abad Romero Dipl. Immanuel Adorjan, until Dr. Srijib Banerjee, since Dipl. Margit Bernroitner, since Dr. Markus Betz, until 7 Department Report Dipl. FH Markus Blaukopf, since Dipl. Rainer Bohrn, until Dipl. Jayakumar Singh Bondili, since Dr. Sergei Boulyga, since Dipl. Martin Fischer, until Dipl. Patrick Galler, since Dipl. Andrea Graziani, until Mag. Leonhard Jaitz, since Mag. Walter Jantschko, until M. Chunsheng Jin, since Dipl. Katherina Kanitsar, until Dipl. Elisabeth Kloser, since Mag. Mirjana Kostic, until Dipl. FH Karin Krainz, since Dr. Thomas Lange, until Dipl. Katharina Lenz, until Dr. Gerd Margreiter, since Dr. Gentiana Nagel, until Dipl. Martina Opietnik, since Mag. Martin Pabst, since Dipl. Anjan Patel, since Dipl. Martina Paumann, until Mag. Maximilian Popp, since Dipl. Elisabeth Rudolph, until B. Maria del Carmen Ruiz Ruiz Dipl. Sonja Schiehser Peter Schmid, until Dr. Gerald Schultheis, until Mag. Georg Sixta, since Dr. Christina Stadlbauer, until Dipl. Johannes Stadlmann, since Dipl. Alexander Standler, until Dipl. Christian Stanetty, since Dr. Zsolt Stefanka, until Dipl. Verena Stingl, until Dr. Michael Sulyok, until Mag. Mayank Thakur, since Dipl. Ivana Tot, since Dipl. Jutta Vlasits, since Dipl. Kurt Wimmer, since M. Yuko Yoneda, since Dipl. The other degree courses have mandatory lecture courses in General Chemistry and optional courses for specialisation. Diploma thesis since Supervisor: Hann Stephan Lenz Katharina Cancerostatic platinum compounds in hospital waste water monitoring and elimination Doctoral thesis Supervisor: Prohaska Thomas, Stingeder Gerhard Swoboda Siegfried Characterization an authentication studies by isotopic and elemental pattern Doctoral thesis since Supervisor: Hann Stephan Schultheis Gerald Stable strontium isotope ratio measurements Characterization of archeological, anthropological and environmental materials Doctoral thesis Supervisor: Altmann Friedrich Gutternigg Matrin Identification, cloning and characterization of invertebrate glycan-modifying enzymes Doctoral thesis Supervisor: Staudacher Erika, Wilson Iain B. Iskratsch Thomas Lectin mapping of glyco-epitopes in muscular dystrophies Diploma thesis Supervisor: Wien 13 Department Report Kandler Barbara Angiogenesis and Bone repair - Evaluation of the angiogenic potential of platelets and

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The method was applied for studying (1) the Î³-value (number of xanthate groups per glucose units) of viscose, (2) the distribution of the xanthate groups on the anhydroglucose unit (AGU), and (3) changes of the xanthate group distribution during ripening.

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