

1. [Comparison of the degradation behavior of cotton, linen, and kozo papers](#)

ผู้แต่ง: Catherine H. Stephens, Paul M. Whitmore

วารสาร: Cellulose, June 2013, Volume 20, Issue 3, pp 1099-1108

**Abstract:** The long term degradation behavior of cotton, linen, and kozo papers was studied to compare changes to the chemical and physical properties with time. The elemental composition,  $\alpha$ -content,  $\beta$ -content,  $\gamma$ -content, and lignin content (K number) of the three unaged controls were determined. The papers were then degraded at 90 °C and 50 % relative humidity for several thousand hours. Changes to the pH, carbonyl content, yellowness index (YI), moisture content, molecular weight, and tensile strength with aging were monitored. The general trends in degradation behavior of linen and kozo papers were similar to cotton in that all three showed decreases in pH, molecular weight, and strength as well as increases in carbonyl content and YI during hydrolysis. However, the kinetics of degradation differed between the three papers. The cellulose component of all three papers dominated measured changes to the molecular weight while the presence of hemicellulose in the linen and kozo papers led to unique measured moisture contents, carbonyl group, and YI values relative to cotton after the same amount of degradation had occurred.

2. [Complexation of hydrazine with native cellulose in water and toluene](#)

ผู้แต่ง: Xiaobo Su, Satoshi Kimura, Masahisa Wada, Ung-Jin Kim, Shigenori Kuga

วารสาร: Cellulose, June 2013, Volume 20, Issue 3, pp 1023-1029

**Abstract:** Adsorption–complexation of cellulose by hydrazine solutions in water and toluene was studied for native cellulose of varied crystallinity. Penetration of hydrazine into cellulose takes place more readily in hydrazine solution of higher concentration and with cellulose of lower crystallinity, but the equilibrium uptake was nearly independent of crystallinity. Complexation from toluene solution takes place at lower hydrazine concentration in toluene than in water, presumably because of the difference in hydrazine–solvent interaction. The adsorption isotherm of hydrazine in water is likely to be sigmoid, implying a cooperative sorption mechanism. It can presumably be ascribed to the disordered structure in the course of complexation.

3. [pH within pores in plant fiber cell walls assessed by Fluorescence Ratio Imaging](#)

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วารสาร: Cellulose, June 2013, Volume 20, Issue 3, pp 1041-1055

**Abstract:** The pH within cell wall pores of filter paper fibers and hemp fibers was assessed by Fluorescence Ratio Imaging (FRIM). It was found that the Donnan effect affected the pH measured within the fibers. When the conductivity of the added liquid was low (0.7 mS), pH values were lower within the cell wall than in the bulk solution. This was not the case at high conductivity (22 mS). The occurrence of the Donnan effect allowed the pH values within pores in normal regions of the cell wall to be compared to the pH in regions with misaligned microfibrils (dislocations) when FRIM was carried out in a low conductivity

solution. Surprisingly, no pH difference was observed between normal regions and dislocations, suggesting that pore sizes within the two different regions are approximately the same. In another experiment the Donnan effect was shown to have an effect on hydrolysis of hydrothermally pretreated wheat straw only when conducted in a low conductivity solution and only for xylanase, not cellulases. The hydrolysis experiments indicate that under typical conditions where conductivity is high, the Donnan effect does not lower the pH close to the substrate to an extent that affects enzymatic activity during hydrolysis of lignocellulose.

#### 4. [Effect of Steam Heating on the Color and Chemical Properties of \*Neosinocalamus Affinis\* Bamboo](#)

ผู้แต่ง: Yamei Zhang, Wenji Yu & Yahui Zhang

วารสาร: Journal of Wood Chemistry and Technology, Volume 33, Issue 4, 2013, pages 235-246

**Abstract:** Fibrous veneers in loose structure were made from *Neosinocalamus affinis* bamboo, and then used as the basic element for bamboo-based fiber composites. Steam treatment of the fibrous veneers was performed inside an autoclave at 0.35 MPa to 0.45 MPa (147°C to 155°C) for 110 min to 170 min. After steam treatment, all three color parameters ( $L^*a^*b^*$ ) of fibrous veneers were changed significantly. The color change ( $\Delta E^*$ ) increased with higher pressure and longer duration. The chemical properties of steam-treated samples were examined using chemical analysis. A decrease in the content of holocellulose and  $\alpha$ -cellulose with an elevation in steam treatment was found. The water extractives content and buffering capacity increased, and the effect of pressure and duration on them increased significantly. pH value decreased significantly compared with control samples, but only small variations were found among steam-treated samples. Through correlation analysis, pH value was strongly correlated to hemicelluloses and water extractives.

#### 5. [Regeneration and Recycling of Aqueous Periodate Solution in Dialdehyde Cellulose Production](#)

ผู้แต่ง: Henrikki Liimatainen, Juho Sirviö, Heikki Pajari, Osmo Hormi & Jouko Niinimäki

วารสาร: Journal of Wood Chemistry and Technology, Volume 33, Issue 4, 2013, pages 258-266

**Abstract:** The regeneration of aqueous iodate solution from the regioselective periodate oxidation of softwood cellulose pulp to dialdehyde cellulose using hypochlorite as a secondary oxidant was studied. The influence of oxidation time on the pulp dissolution and regeneration efficacy was examined in particular. In addition, the recycling of regenerated periodate solution back to oxidation was clarified. The solutions from the 10 and 15 min oxidations were regenerated with 100% conversion efficacy when 1.2–1.4 times the stoichiometric amounts of hypochlorite were used. However, the regeneration efficacy decreased when the reaction time in the oxidation increased to 30 min because the content of soluble impurities, which consumed the hypochlorite in the side-reactions, increased significantly as the oxidation reaction proceeded. The regenerated solutions possessed good oxidation performance, showing that periodate was successfully regenerated using hypochlorite and supporting the assumption that periodate can be effectively recycled in the process when short oxidation times are used.

## 6. [Study on a bamboo stressed flattening process](#)

ผู้แต่ง: Jin Liu, Haiyang Zhang, Laurent Chrusciel, Bin Na, Xiaoning Lu

วารสาร: European Journal of Wood and Wood Products, May 2013, Volume 71, Issue 3, pp 291-296

**Abstract:** Bamboo stressed flattening process is an innovative forming technique. In this process, a pair of horizontal loads was exerted on both sides of a bamboo piece to counteract the tensile stress of the bamboo inner layer in response to flattening. The theoretical model of this process was developed and introduced in this paper. A special device that is capable of providing the loads required was constructed and various series of experiments on bamboo pieces of 1/3 round (cut from different positions of bamboo and having different diameter and thickness) were performed. The results suggested that over 78 % of the 108 total bamboo samples were flattened successfully which verified the correctness and feasibility of the process.

## 7. [Characterization of water-soluble extracts from hot-pressed poplar](#)

ผู้แต่ง: Noridah B. Osman, Armando G. McDonald, Marie-Pierre G. Laborie

วารสาร: European Journal of Wood and Wood Products, May 2013, Volume 71, Issue 3, pp 343-351

**Abstract:** Thermal modification of wood constituents occurs upon hot-pressing of flakes during consolidation of oriented strand board (OSB). Hence, the effects of hot-pressing of hybrid poplar on water-soluble extractives were studied. Poplar veneers were pre-conditioned to 0 or 8 % moisture content and subsequently hot-pressed at 150, 200 or 250 °C. Aqueous extracts were characterized by conventional chemical methods in conjunction with chromatography (HPLC and SEC), mass spectrometry (ESI-MS) and spectroscopy (FTIR) analysis. Water-soluble fractions were markedly influenced by thermal compression treatment at 250 °C compared to the lower temperatures. Chromatographic results indicate that water-soluble extractives content increases with temperature while the degree of polymerization decreases with detection at low temperature levels. FTIR spectroscopic analysis indicates changes in aqueous-extracts composition of wood monosaccharides (hemicelluloses), meanwhile ESI-MS detected xylo-oligosaccharides. These results clearly show that heat treatment dictated the changes in each water-soluble extractive component and they respond independently with different treatment.

## 8. [Real-time process modeling of particleboard manufacture using variable selection and regression methods ensemble](#)

ผู้แต่ง: Nicolas André, Timothy M. Young

วารสาร: European Journal of Wood and Wood Products, May 2013, Volume 71, Issue 3, pp 361-370

**Abstract:** This study focuses on the real-time prediction of mechanical properties such as internal bond strength (IB) and modulus of rupture (MOR) for a wood composite panels manufacturing process. As wood composite panel plants periodically test their products, a real time data fusion application was developed to align laboratory mechanical test results and their corresponding process data. Fused data were employed to build regression models that yield real-time predicted mechanical property values when new process data become available. The modeling algorithm core uses genetic algorithm to preselect a meaningful subset of process variables. Calibration models are then built using several regression methods: multiple linear regression, ridge regression, neural networks, and partial least squares regression (PLS). Four different predicted response

values were generated for each new record of real time process variables. On-line validation results showed good performance of the ridge regression method with a 0.89 correlation coefficient between actual and predicted MOR values, a root mean square error (RMSEP) of 1.05 MPa and a mean normalized error of 9 %. IB was best predicted by PLS with a 0.81 correlation coefficient between actual IB and PLS predicted IB values, a RMSEP of 75.1 kPa, and a mean normalized error of 15 %.

#### 9. [Synergistic effect of hydrolyzed collagen in the dyeing of wool](#)

ผู้แต่ง: Marolda Brouta-Agnésa, Sandra Balsells, Roshan Paul

วารสาร: Dyes and Pigments, Volume 99, Issue 1, October 2013, Pages 116–119

**Abstract:** The effect of hydrolyzed collagen in the dyeing of wool was investigated. The main objective of the study was to enhance the exhaustion of the reactive and acid dyes on wool by using hydrolyzed collagen as a dyebath additive. First of all, the optimum dyeing parameters were determined followed by the optimization of the proportion of hydrolyzed collagen to be added to the dyebath. Study was also carried out to determine the most adequate fraction of the hydrolyzed collagen that can ensure high dye affinity to wool and the dyeing mechanism was elucidated. The results are promising and contribute toward the “greening” of the wool dyeing process, as the hydrolyzed collagen is a natural and bio-degradable product.

#### 10. [New purple-blue ceramic pigments based on \$\text{CoZr}\_4\(\text{PO}\_4\)\_6\$](#)

ผู้แต่ง: Nataliia Gorodylova, Veronika Kosinová, Žaneta Dohnalová, Petr Bělina, Petra Šulcová

วารสาร: Dyes and Pigments, Volume 98, Issue 3, September 2013, Pages 393–404

**Abstract:** Due to the outstanding stability and resistivity to dissolution agents of the compounds related to  $\text{NaZr}_2(\text{PO}_4)_3$  (NZP family), our attention has been focussed on  $\text{CoZr}_4(\text{PO}_4)_6$  and its performance as an inorganic pigment for coloration of ceramic glazes. Mixed cobalt zirconium phosphate has been prepared by a solid state reaction and a sol–gel method and was characterised (through thermal analysis, XRD, heating microscopy, SEM, VIS-spectrophotometry and lightfastness measurement) for the first time as a ceramic pigment. In order to reduce the cobalt content in the samples the series of  $\text{Co}_{1-x}\text{Mg}_x\text{Zr}_4(\text{PO}_4)_6$  ( $x = 0.25; 0.5$ ) have also been prepared using a solid state reaction and were investigated with the same techniques. It was shown that a solid state reaction provides the formation of  $\text{CoZr}_4(\text{PO}_4)_6$  through a three component system stage ( $\text{ZrP}_2\text{O}_7$ ,  $\text{ZrO}_2$  and  $\text{CoP}_2\text{O}_6/\text{Co}_2\text{P}_2\text{O}_7$ ), when employment of the sol–gel method leads to the direct formation of a  $\text{CoZr}_4(\text{PO}_4)_6$  phase at lower temperatures. During further thermal treatment, with an increase of the calcination temperature up to 1200–1300 °C, an additional phase of  $\text{Zr}_2\text{O}(\text{PO}_4)_2$  appears in the composition. A solid state reaction can be suggested as a preferable method for achieving enhanced thermal stability of this phosphate and the substitution of Co by Mg not only helps to reduce the content of Co in the sample compositions, but also to improve their thermal characteristics. Thus, the obtained results indicate that employment of the more complicated sol–gel method does not provide any advantages at high calcination temperatures with respect to the phase composition, thermal stability, homogeneity and particle size distribution of the obtained samples and the conventional ceramic route does not deteriorate on the basis of these parameters. An irregular change of the colour parameters was observed for the samples during the calcination and the temperature of 1300 °C and 6–12 h of soaking

time were chosen for pigment synthesis. Colouring ability of the obtained samples has been analysed with two types of ceramic glazes. The mixed phosphates exhibit saturated purple-blue colour, which becomes lighter only with an increase of Mg content to  $x = 0.5$ . Enamelled samples showed excellent lightfastness and the investigated compounds can be considered as high performance inorganic pigments for coloration of ceramic glazes.