

# Green Chemistry

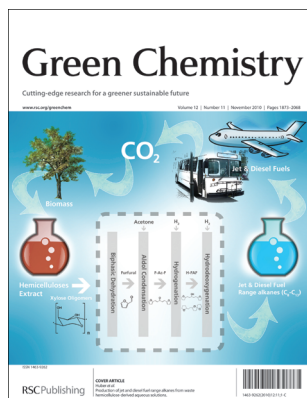
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## IN THIS ISSUE

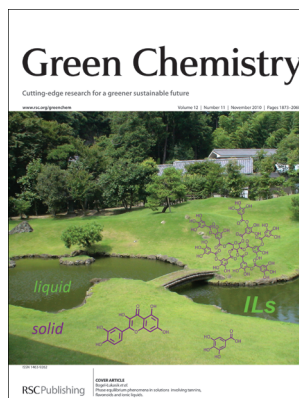
ISSN 1463-9262 CODEN GRCHFJ 12(11) 1873–2068 (2010)



### Cover

See Huber *et al.*, pp. 1933–1946.

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### Inside cover

See Bogel-Łukasik *et al.*, pp. 1947–1953.

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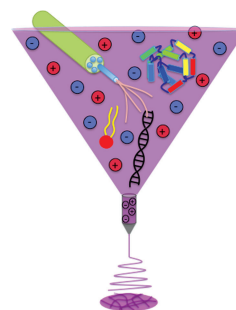
## PERSPECTIVE

1883

### Electrospinning from room temperature ionic liquids for biopolymer fiber formation

Luciana Meli, Jianjun Miao, Jonathan S. Dordick\* and Robert J. Linhardt\*

A review of the state of the art in electrospinning from room temperature ionic liquids to produce biopolymer fibers.



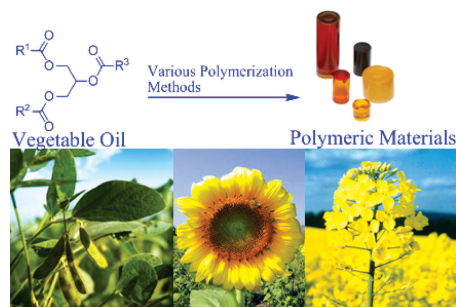
## CRITICAL REVIEW

1893

### Vegetable oil-based polymeric materials: synthesis, properties, and applications

Ying Xia and Richard C. Larock\*

The use of vegetable oils as renewable raw materials for the synthesis of various polymeric materials is reviewed.



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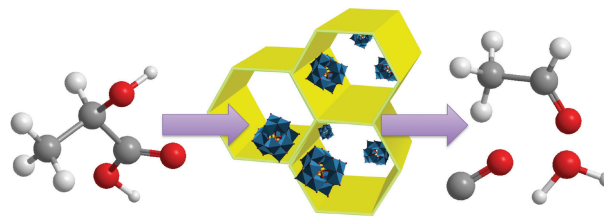
## COMMUNICATIONS

1910

**Highly efficient catalyst for the decarbonylation of lactic acid to acetaldehyde**

Benjamin Katryniok, Sébastien Paul and Franck Dumeignil\*

SBA-15-supported silicotungstic acid is revealed as a very efficient catalyst for lactic acid decarbonylation, with a very high selectivity to acetaldehyde (98%) at high conversion (85%).

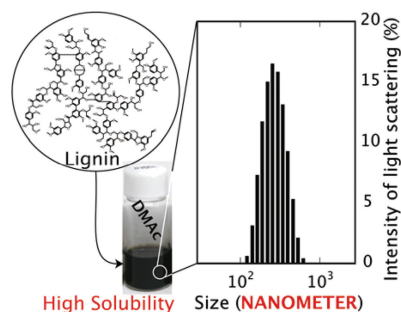


1914

**Polyfunctional nanometric particles obtained from lignin, a woody biomass resource**

Kazuhiro Shikinaka, Nozomu Fujii, Shun Egashira, Yoshihiko Murakami, Masaya Nakamura, Yuichiro Otsuka, Seiji Ohara and Kiyotaka Shigehara\*

Monodispersed nanoparticles with a polyfunctional nature were obtained by the simultaneous enzymatic saccharification and physical comminution of lignin.

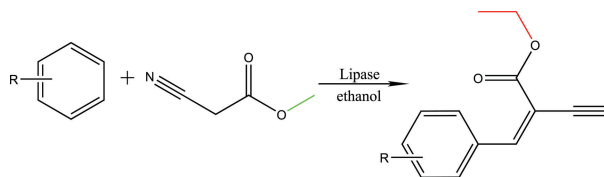


1917

**Lipase-catalysed tandem Knoevenagel condensation and esterification with alcohol cosolvents**

Yi-Feng Lai, Hui Zheng, She-Jie Chai, Peng-Fei Zhang\* and Xin-Zhi Chen\*

Lipase-catalysed tandem Knoevenagel condensation and esterification with high yield in alcohol cosolvents. Lipase from porcine pancreas has higher activity for this “promiscuous” reaction than for naturally occurring esterification catalysis.

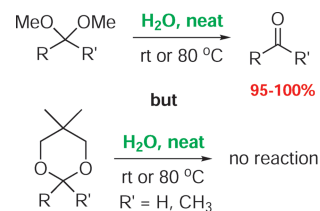


1919

**Mild water-promoted selective deacetalisation of acyclic acetals**

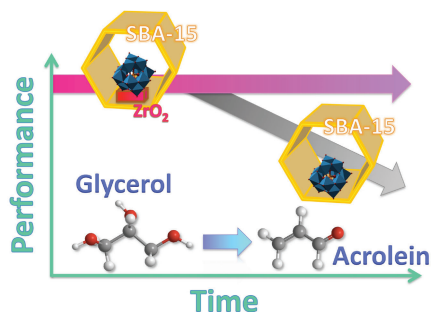
D. Bradley G. Williams,\* Adam Cullen, Alex Fourie, Hendrik Henning, Michelle Lawton, Wayne Mommsen, Portia Nangu, Jonathan Parker and Alicia Renison

Acyclic acetals deprotect in uncatalysed reactions in aqueous medium while cyclic acetals remain intact; selectivity is also shown.



## COMMUNICATIONS

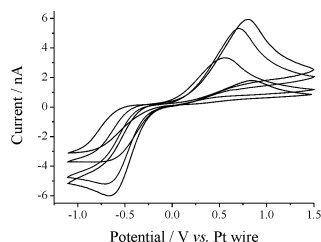
1922

**A long-life catalyst for glycerol dehydration to acrolein**

Benjamin Katryniok, Sébastien Paul, Mickaël Capron, Christine Lancelot, Virginie Bellière-Baca, Patrick Rey and Franck Dumeignil\*

Using a zirconia-grafted SBA-15 instead of bare SBA-15 as a support of the HPA active phase enabled a substantial improvement of the glycerol dehydration catalytic reaction, with an acrolein yield observed after 24 h on stream of 69% vs. 24%, respectively.

1926



Electrochemically form Pd/H in an Ionic Liquid

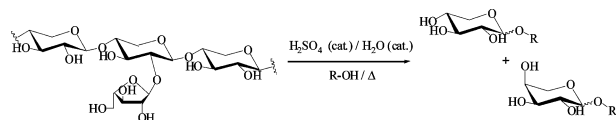
Electrochemically monitor Pd/H consumption during hydrogenolysis of Z-lys(Z)-OH in the Ionic Liquid

**Hydrogenolysis without hydrogen gas: hydrogen loaded palladium electrodes by electrolysis of H[NTf<sub>2</sub>] in a room temperature ionic liquid**

Yao Meng, Leigh Aldous and Richard G. Compton\*

Electrochemical hydrogenolysis has been demonstrated in a room temperature ionic liquid for the first time. Hydrogenation of *N,N'*-bis(benzyloxycarbonyl)-L-lysine was observed to proceed rapidly, which was monitored electrochemically by the consumption of Pd/H.

1929

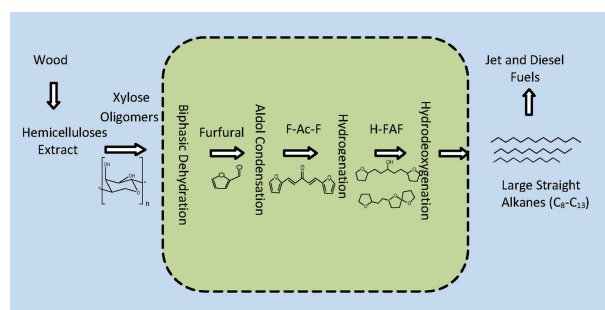
**Direct conversion of wheat bran hemicelluloses into n-decyl-pentosides**

Sinisa Marinkovic and Boris Estrine\*

The preparation of pentose based surfactants has been achieved by a direct transglycosylation reaction carried out on wheat bran in *n*-decyl alcohol and under smooth conditions.

## PAPERS

1933

**Production of jet and diesel fuel range alkanes from waste hemicellulose-derived aqueous solutions**

Rong Xing, Ayyagari V. Subrahmanyam, Hakan Olcay, Wei Qi, G. Peter van Walsum, Hemant Pendse and George W. Huber\*

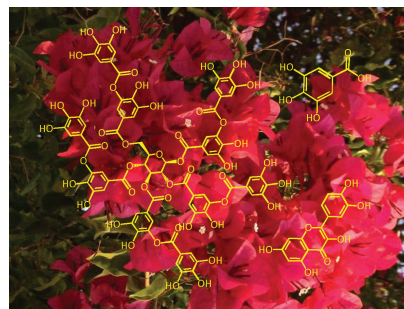
In this paper we report a novel four-step process for the production of jet and diesel fuel range alkanes from hemicellulose extracts derived from northeastern hardwood trees.

1947

### Phase equilibrium phenomena in solutions involving tannins, flavonoids and ionic liquids

Rafał Bogel-Lukasik,\* Linda Maria Nobre Gonçalves and Ewa Bogel-Lukasik

The solubility studies of phenolics in ILs is a simple and direct method for the optimisation of extraction conditions from natural products.

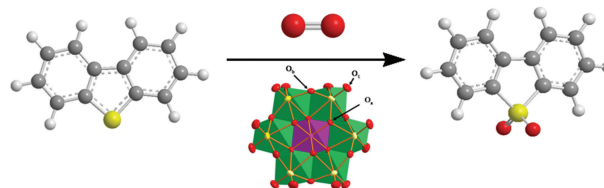


1954

### Aerobic oxidative desulfurization of benzothiophene, dibenzothiophene and 4,6-dimethyldibenzothiophene using an Anderson-type catalyst [(C<sub>18</sub>H<sub>37</sub>)<sub>2</sub>N(CH<sub>3</sub>)<sub>2</sub>]<sub>5</sub>[IMo<sub>6</sub>O<sub>24</sub>]

Hongying Lü,\* Yongna Zhang, Zongxuan Jiang and Can Li\*

Benzothiophene, dibenzothiophene and 4,6-dimethyldibenzothiophene are oxidized to their corresponding sulfones by an Anderson-type catalyst [(C<sub>18</sub>H<sub>37</sub>)<sub>2</sub>N(CH<sub>3</sub>)<sub>2</sub>]<sub>5</sub>IMo<sub>6</sub>O<sub>24</sub> using molecular oxygen as the oxidant under mild reaction conditions.

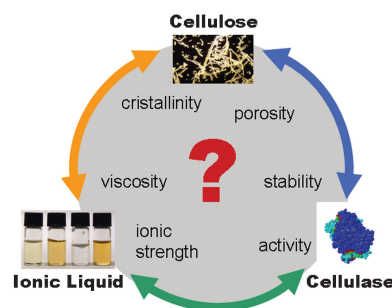


1959

### Point by point analysis: how ionic liquid affects the enzymatic hydrolysis of native and modified cellulose

Philip Engel, Radoslav Mladenov, Helene Wulforst, Gernot Jäger and Antje C. Spiess\*

The ionic liquid pretreatment of cellulose facilitates the enzymatic hydrolysis to glucose. For a potential process with regenerated cellulose in the presence of residual ionic liquid, the effects of ionic liquid and cellulose pretreatment on the enzyme activity and stability needs to be investigated in detail and is addressed here.

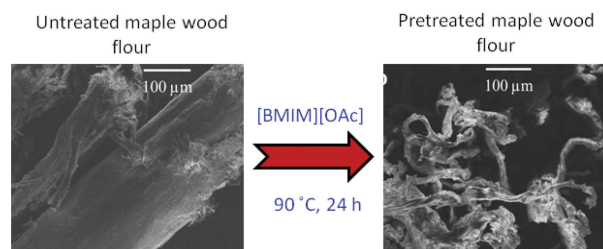


1967

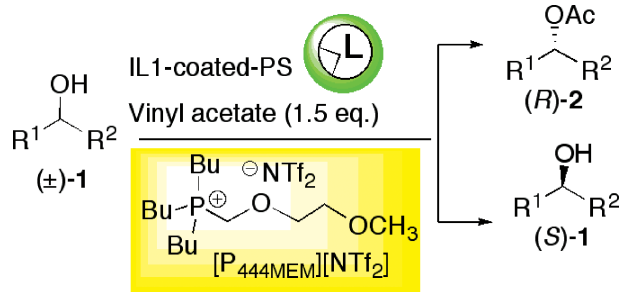
### Ionic liquid solvent properties as predictors of lignocellulose pretreatment efficacy

Thomas V. Doherty, Mauricio Mora-Pale, Sage E. Foley, Robert J. Linhardt and Jonathan S. Dordick\*

Room temperature ionic liquids containing [OAc<sup>-</sup>] anions, with high Kamlett-Taft β parameter values (β > 1), are effective solvents for pretreatment of recalcitrant maple wood flour.



1976

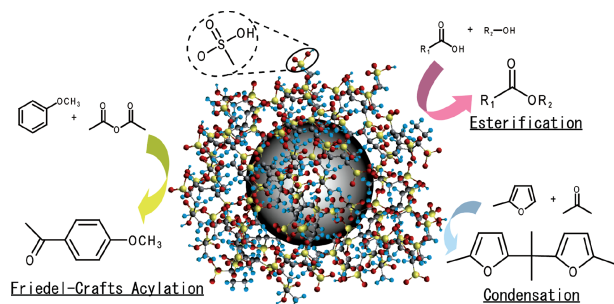


### A rational design of phosphonium salt type ionic liquids for ionic liquid coated-lipase catalyzed reaction

Yoshikazu Abe, Kazuhide Yoshiyama, Yusuke Yagi, Shuichi Hayase, Motoi Kawatsura and Toshiyuki Itoh\*

A very rapid transesterification of secondary alcohols accomplished using an ionic liquid-coated lipase PS (IL1-PS) in  $[\text{P}_{444}\text{MEM}][\text{NTf}_2]$ .

1981

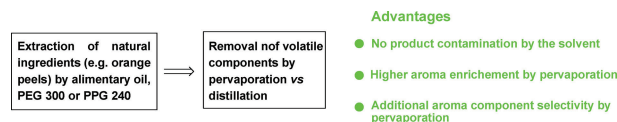


### Poly(vinylsulfonic acid)-grafted solid catalysts: new materials for acid-catalysed organic synthetic reactions

Teruyuki Okayasu, Kei Saito, Hiroyuki Nishide\* and Milton T. W. Hearn\*

High-density poly(vinylsulfonic acid)-grafted solid acid materials with extremely high acid dissociation abilities have been synthesized and characterized. The catalytic performance of these materials in various acid-catalyzed reactions has been documented.

1990

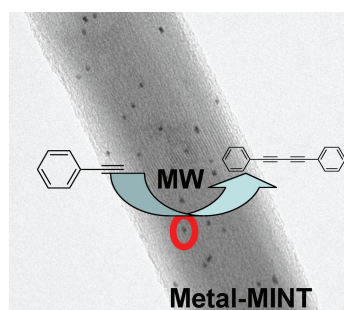


### Selective extraction of natural products with benign solvents and recovery by organophilic pervaporation: fractionation of D-limonene from orange peels

Prashant S. Kulkarni, Carla Brazinha, Carlos A. M. Afonso and João G. Crespo\*

This work describes a simple, environmentally friendly process for the extraction, recovery and fractionation of D-limonene from orange peels based on a combination of extraction using benign non-volatile solvents with organophilic pervaporation. This integrated process was compared with a traditional product recovery process by vacuum distillation.

1995



### Catalytically active self-assembled silica-based nanostructures containing supported nanoparticles

Camino Gonzalez-Arellano, Alina Mariana Balu, Rafael Luque\* and Duncan J. Macquarrie

Tubular silica-based nanostructures containing metal nanoparticles were found to be catalytically active in the microwave-assisted homocoupling of terminal alkynes.

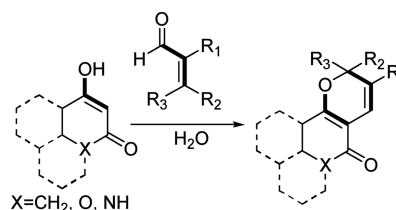
## PAPERS

2003

**Environmentally benign, one-pot synthesis of pyrans by domino Knoevenagel/6 $\pi$ -electrocyclization in water and application to natural products**

Ene Jin Jung, Byung Ho Park and Yong Rok Lee\*

In water medium, environmentally benign, facile, and efficient synthesis of pyrans was achieved in good yields by the reactions of a variety of cyclic 1,3-dicarbonyls with several  $\alpha,\beta$ -unsaturated aldehydes. The key strategy was a formal [3+3] cycloaddition by domino Knoevenagel/6 $\pi$ -electrocyclization.

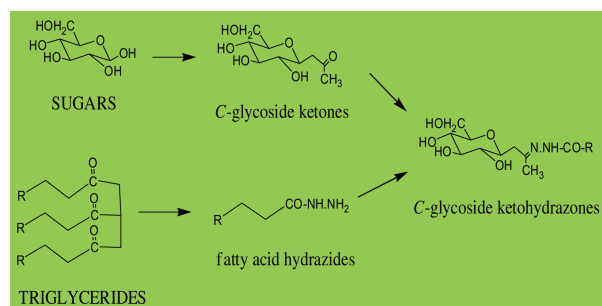


2012

**Preparation of saturated and unsaturated fatty acid hydrazides and long chain C-glycoside ketohydrazones**

Chrissie A. Carpenter, James A. Kenar and Neil P. J. Price\*

Described is an aqueous-based green synthesis of long chain C-glycoside ketohydrazones from triglyceride oils and aldose sugars.

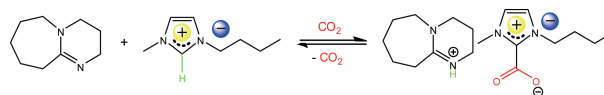


2019

**Equimolar CO<sub>2</sub> capture by imidazolium-based ionic liquids and superbase systems**

Congmin Wang, Huimin Luo, Xiaoyan Luo, Haoran Li\* and Sheng Dai\*

The integrated systems consisting of imidazolium-based ILs and superbases are highly efficient, and reversible for the capture of CO<sub>2</sub> using the acidity of the C-2 proton of ILs.



2024

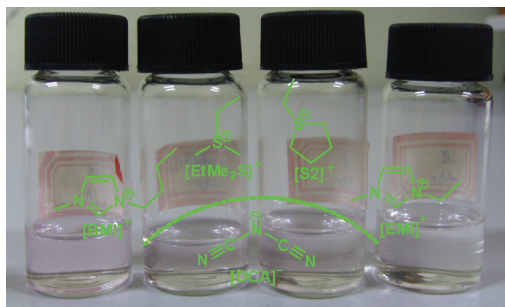
**Highly active and recyclable silica gel-supported palladium catalyst for mild cross-coupling reactions of unactivated heteroaryl chlorides**

Dong-Hwan Lee, Ji-Young Jung and Myung-Jong Jin\*

Pd@SiO<sub>2</sub> was shown to be a highly active and long-lived catalyst for aqueous Suzuki, Stille and Sonogashira cross-coupling reactions of heteroaryl chlorides. A wide range of heteroaryl chlorides could be efficiently coupled with different nucleophilic partners in the presence of only 0.5 mol% catalyst and under very mild conditions. Furthermore, the catalyst could be reused with consistent activity.



2030

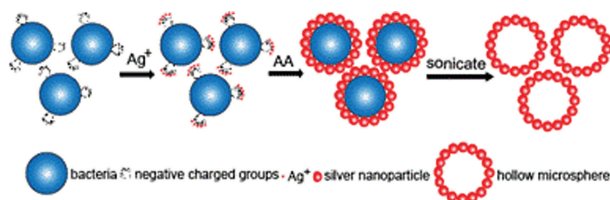


### Extractive desulfurization of fuel oils with low-viscosity dicyanamide-based ionic liquids

Charles Asumana, Guangren Yu, Xi Li, Jingjing Zhao, Ge Liu and Xiaochun Chen\*

A new option for the deep desulfurization of fuel oils using low-viscosity ionic liquids.

2038

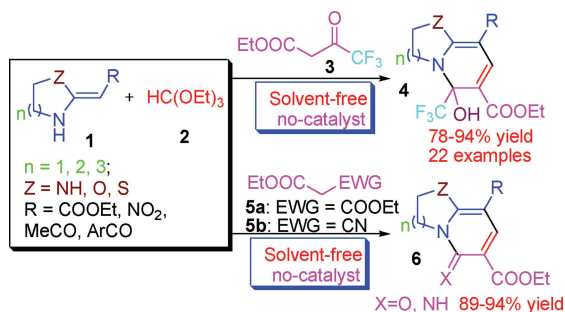


### Bacteria-template synthesized silver microspheres with hollow and porous structures as excellent SERS substrate

Da-Peng Yang, Shouhui Chen, Peng Huang, Xiansong Wang, Weiqiao Jiang, Omar Pandoli and Daxiang Cui\*

Hollow and porous silver microspheres are synthesized using bacteria as template. They have been proven to be excellent SERS substrate.

2043

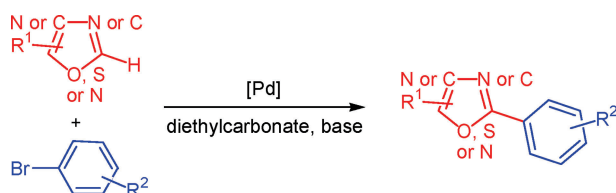


### Three-component solvent-free synthesis of highly substituted bicyclic pyridines containing a ring-junction nitrogen

Shengjiao Yan, Yulan Chen, Lin Liu, Nengqin He and Jun Lin\*

An efficient one-pot, three-component synthesis of highly substituted bicyclic pyridines containing a ring-junction nitrogen, starting from simple materials, is described.

2053



### Carbonates: eco-friendly solvents for palladium-catalysed direct arylation of heteroaromatics

Jia Jia Dong, Julien Roger, Cécile Verrier, Thibaut Martin, Ronan Le Goff, Christophe Hoarau\* and Henri Doucet\*

The palladium-catalysed direct 2-, 4- or 5-arylation of a wide range of heteroaromatics with aryl halides proceed in moderate to good yields using the eco-friendly solvents carbonates.