

## Contents

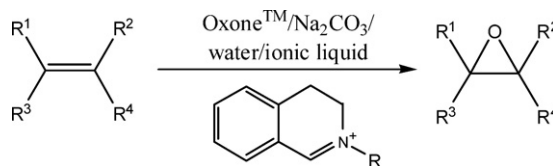
### Articles

**Jacob M. Crosthwaite, Victoria A. Farmer,  
Jason P. Hallett, Tom Welton**

The use of 2-alkyl-3,4-dihydroisoquinolinium salts as catalysts for the epoxidation of alkenes by Oxone™ was investigated in a variety of ionic liquids.

*Journal of Molecular Catalysis A: Chemical 279 (2008) 148*

Epoxidation of alkenes by Oxone™ using 2-alkyl-3,4-dihydroisoquinolinium salts as catalysts in ionic liquids



**Jian-Ying Wang, Feng-Yun Zhao, Run-Jing Liu,  
Yong-Qi Hu**

A convenient and efficient application of *tert*-butyl hydroperoxide/metal-containing ZSM-5 in ionic liquids [emim]BF<sub>4</sub> for the oxidation of cyclohexane to cyclohexanone and cyclohexanol is described. As shown in the below table, good yields and higher selectivity of products were obtained in ionic liquid compared with in molecular solvent. The catalytic activity of FeZSM-5 was superior to that of other MZSM-5 and the as-received HZSM-5 in ionic liquid. For cyclohexane oxidation catalyzed by FeZSM-5, 20.9% conversion of cyclohexane and 98.2% selectivity of desired products were obtained in ionic liquid. The catalyst/ionic liquid system could be successfully recycled by a simple decantation procedure without significant loss of activity.

*Journal of Molecular Catalysis A: Chemical 279 (2008) 153*

Oxidation of cyclohexane catalyzed by metal-containing ZSM-5 in ionic liquid

Catalyst	Solvent	Conversion (mol%)	Product distribution (mol%) <sup>a</sup>				Selectivity of $\alpha$ -one $\alpha$ -ol-CHHP (%)
			$\alpha$ -one	$\alpha$ -ol	CHHP	$\alpha$ -one $\alpha$ -ol	
HZSM-5	no solvent	0.98	0.3	0.68	0	0.44	100
HZSM-5	acetone	3.29	0	1.29	1.17	0	74.7
FeZSM-5	acetone	3.81	0.6	1.35	1.03	0.44	78.2
HZSM-5	[emim]BF <sub>4</sub>	15.8	6.98	2.70	5.64	2.59	97.0
NiZSM-5	[emim]BF <sub>4</sub>	15.9	8.2	2.84	4.39	2.89	97.1
CoZSM-5	[emim]BF <sub>4</sub>	14.2	9.82	3.53	0.71	2.78	99.0
MnZSM-5	[emim]BF <sub>4</sub>	15.5	10.3	3.06	1.77	3.39	97.6
FeZSM-5	[emim]BF <sub>4</sub>	20.9	12.1	3.27	5.15	3.70	98.2
CuZSM-5	[emim]BF <sub>4</sub>	9.5	6.15	3.31	0	1.86	100

Reaction conditions: 0.15 g catalyst, 27.8 mmol cyclohexane, 55.6 mmol TBHP (85% in H<sub>2</sub>O), 5 ml (6.25 g) ionic liquid, 12h and 90 °C.  $\alpha$ -one, cyclohexanone;  $\alpha$ -ol, cyclohexanol; CHHP, cyclohexyl hydroperoxide.

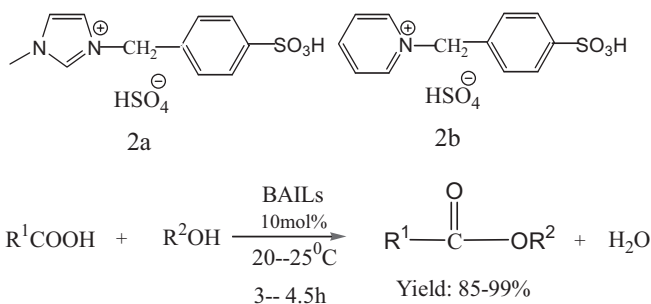
<sup>a</sup> Other than cyclohexanol, cyclohexanone, cyclohexyl hydroperoxide, *n*-hexanal and adipic acid formed in ionic liquid.

**Xinzhong Li, Wumanjiang Eli**

Two novel Brønsted acidic ionic liquids (**2a** and **2b**) served as efficient and reusable catalysts, which could promoted Fischer esterification of long chain aliphatic acids with methanol and ethanol, the reactions carried out smoothly at room temperature with excellent yields.

*Journal of Molecular Catalysis A: Chemical 279 (2008) 159*

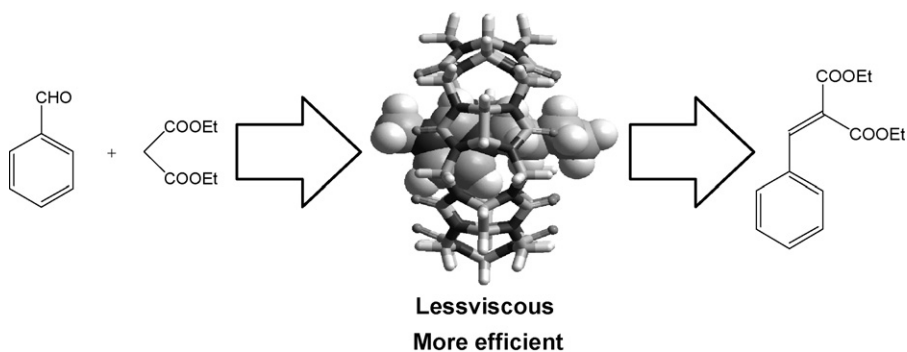
A green approach for the synthesis of long chain aliphatic acid esters at room temperature



**Pedro Montes-Navajas, Avelino Corma, Hermenegildo Garcia**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 165

Supramolecular ionic liquids based on host–guest cucurbituril imidazolium complexes

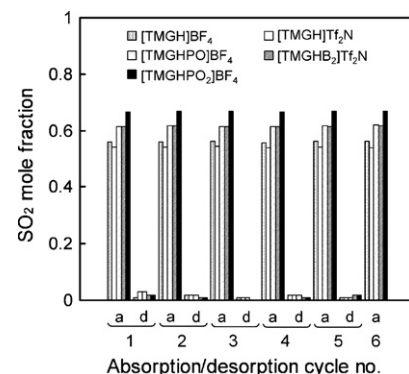


**Jun Huang, Anders Riisager, Rolf W. Berg, Rasmus Fehrmann**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 170

Tuning ionic liquids for high gas solubility and reversible gas sorption

Novel 1,1,3,3-tetramethylguanidinium ionic liquids are highly efficient, reversible absorbents for gaseous sulfur dioxide and ammonia, providing unprecedented gas absorption capability of up to two moles at ambient conditions. Gas absorption enthalpies, Raman and UV–vis spectra of the gas-saturated ionic liquids reveal moderate solvent–solute interaction facilitating their applications for gas-storage, -separation and reaction media for, e.g. catalytic processes involving gaseous reactants.

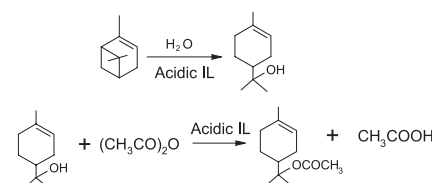


**Shi-Wei Liu, Shi-Tao Yu, Fu-Sheng Liu, Cong-Xia Xie, Lu Li, Kai-Hui Ji**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 177

Reactions of  $\alpha$ -pinene using acidic ionic liquids as catalysts

Hydration of  $\alpha$ -pinene and esterification of  $\alpha$ -terpineol have been investigated in the presence of various acidic ionic liquids. It was found that the cations of ionic liquids determined catalytic performance of acidic ionic liquids, and the anions had obvious effect on the selectivity of desired products. It was also found that ionic liquid 1-methyl-3-(3-sulfo-propyl)-imidazolium dihydrogen phosphate ( $[\text{HSO}_3\text{-pmim}][\text{H}_2\text{PO}_4]$ ) exhibited outstanding catalytic properties in both reactions. Furthermore, the effective product isolation combined with the recyclable catalyst is expected to contribute to the development of clean and environmentally friendly strategy for the synthesis of  $\alpha$ -terpineol and  $\alpha$ -terpinyl acetate.

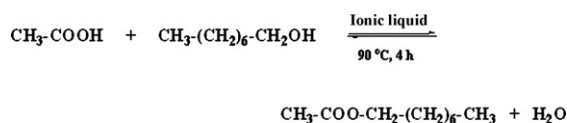


**Pralhad A. Ganeshpure, Gigi George, Jagannath Das**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 182

Brønsted acidic ionic liquids derived from alkylamines as catalysts and mediums for Fischer esterification: Study of structure–activity relationship

A series of ionic liquids based on alkylammonium salts were synthesized. The ionic liquids were used as catalysts and mediums for the esterification of acetic acid with 1-octanol as a probe to understand their structure–activity relationship in the Fischer esterification.



**Ionic liquids:**

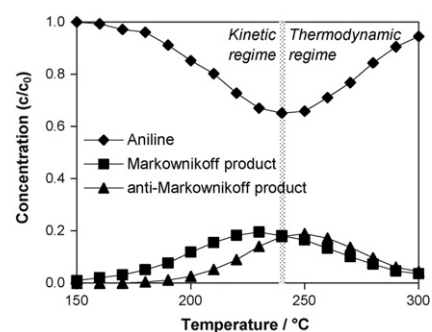
$[\text{Et}_3\text{NH}][\text{HSO}_4]$ ,  $[\text{Et}_3\text{NH}][\text{H}_2\text{PO}_4]$ ,  $[\text{Et}_3\text{NH}][\text{BF}_4]$ ,  $[\text{Et}_3\text{NH}][p\text{-CH}_3\text{C}_6\text{H}_4\text{SO}_3]$ ,  
 $[\text{Et}_2(\text{PhCH}_2\text{NH})][\text{HSO}_4]$ ,  $[n\text{-Bu}_3\text{NH}][\text{HSO}_4]$ ,  $[n\text{-Oct}_3\text{NH}][\text{HSO}_4]$ ,  
 $[\text{Et}_2\text{NH}_2][[\text{HSO}_4]$ ,  $[\text{Et}_2\text{NH}_2][[\text{H}_2\text{PO}_4]$ ,  $[\text{Et}_2\text{NH}_2][[\text{BF}_4]$ ,  $[t\text{-Pr}_2\text{NH}_2][[\text{HSO}_4]$ ,  
 $[\text{EtNH}_3][[\text{HSO}_4]$ ,  $[\text{EtNH}_3][[\text{H}_2\text{PO}_4]$ ,  $[\text{EtNH}_3][[\text{BF}_4]$

**Carsten Sievers, Oriol Jiménez, Richard Knapp, Xilei Lin, Thomas E. Müller, Andreas Türler, Birgit Wierczinski, Johannes A. Lercher**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 187

Palladium catalysts immobilized in thin films of ionic liquid for the direct addition of aniline to styrene

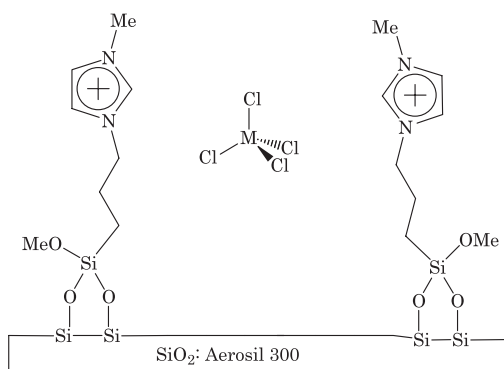
The addition of aniline to styrene was catalyzed with a novel type of bi-functional catalyst, where a palladium complex and Brønsted acid were immobilized in a thin film of supported ionic liquid. While the reaction was selective for the Markownikoff product at low temperatures, formation of the *anti*-Markownikoff product was also observed at higher temperatures.



**Takehiko Sasaki, Mizuki Tada, Chongmin Zhong, Takao Kume, Yasuhiro Iwasawa**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 200

Immobilized metal ion-containing ionic liquids: Preparation, structure and catalytic performances in Kharasch addition reaction and Suzuki cross-coupling reactions

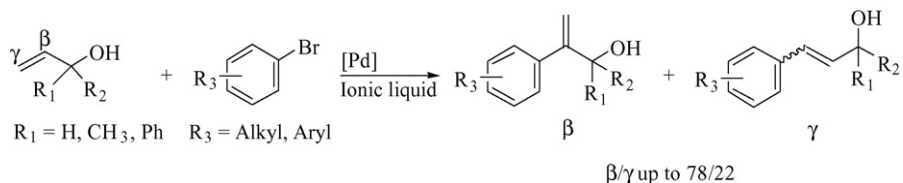


**Shifang Liu, Nick Thomson, Alan Pettman, Zeynab Hyder, Jun Mo, Jianliang Xiao**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 210

Ionic liquids as solvent for regioselective arylation of  $\alpha$ -substituted allylic alcohols by aryl bromides

Ionic liquid is shown to promote the Pd-DPPP catalyzed regioselective Heck arylation of  $\alpha$ -substituted allylic alcohols by aryl bromides, affording  $\beta/\gamma$  ratios of up to 78/22.

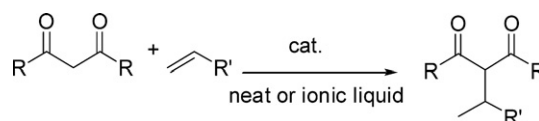


**Heather E. Lanman, Rene-Viet Nguyen, Xiaoquan Yao, Tak-Hang Chan, Chao-Jun Li**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 218

Evaluating Lewis acid catalyzed hydroalkylation of alkenes in neat and in ionic liquids

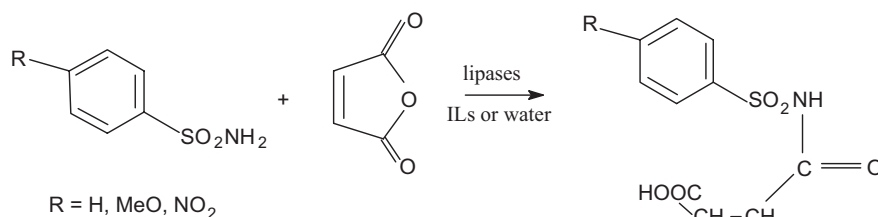
Addition of 1,3-dicarbonyls to alkenes is catalyzed by 10%  $\text{SnBr}_4$  in ionic liquid or by 10%  $\text{Cu}(\text{OTf})_2$  in solventless conditions. The method is more environmentally benign and avoids the use of volatile organic solvents.



**L. Mantarosie, S. Coman, V.I. Parvulescu**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 223

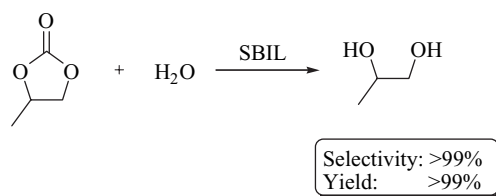
Comparative behavior of various lipases in benign water and ionic liquids solvents

**Lin-Fei Xiao, Qun-Feng Yue, Chun-Gu Xia, Li-Wen Xu**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 230

Supported basic ionic liquid: Highly effective catalyst for the synthesis of 1,2-propylene glycol from hydrolysis of propylene carbonate

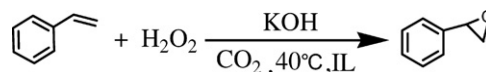
Hydrolysis of propylene carbonate to 1,2-propylene glycol was performed by using a SBIL catalyst. It was found that more than 99% yield and selectivity were obtained in the presence of SBIL at the optimum conditions. Additionally, the catalyst could be reused at least up five times with slight loss of catalytic activity.

**Jinliang Song, Zhaofu Zhang, Tao Jiang, Suqin Hu, Wenjing Li, Ye Xie, Buxing Han**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 235

Epoxidation of styrene to styrene oxide using carbon dioxide and hydrogen peroxide in ionic liquids.

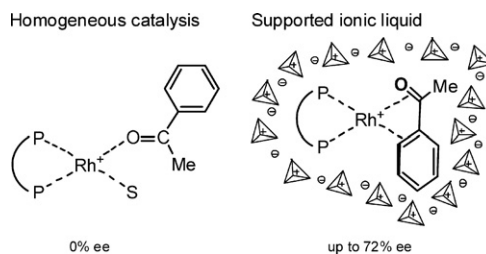
Epoxidation of styrene to styrene oxide using carbon dioxide and hydrogen peroxide in ionic liquids was studied. The various reaction parameters in the epoxidation of styrene were investigated. The pressure of CO<sub>2</sub>, equivalents of KOH and H<sub>2</sub>O<sub>2</sub>, reaction time and different ionic liquids had influence on the conversion of styrene and the yield of styrene oxide.

**Kam Loon Fow, Stephan Jaenicke, Thomas E. Müller, Carsten Sievers**

*Journal of Molecular Catalysis A: Chemical* 279 (2008) 239

Enhanced enantioselectivity of chiral hydrogenation catalysts after immobilisation in thin films of ionic liquid

Chiral complexes immobilized in silica supported thin films of ionic liquid provided considerable enantioselectivity in the hydrogenation of acetophenone. In contrast, no enantioselectivity was observed in the corresponding homogeneous catalysis. As explanation for this phenomenon, the formation of solvent cages of ionic liquid molecules around the organometallic complexes is proposed, which leads to enhanced substrate-catalyst interactions.



**C. Paun, J. Barklie, P. Goodrich,  
H.Q.N. Gunaratne, A. McKeown,  
V.I. Pârvulescu, C. Hardacre**

*Journal of Molecular Catalysis A: Chemical* 279  
(2008) 248

Supported and liquid phase task specific ionic  
liquids for base catalysed Knoevenagel reactions

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