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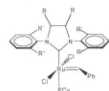
INO-PO-29

Ru-Based Complexes Bearing Saturated Chiral N-Heterocyclic Carbene Ligands: efficient catalysts for olefin metathesis

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Olefin metathesis has emerged as a powerful tool in both organic and polymer chemistry. A variety of applications have become accessible, including ring closing metathesis (RCM), cross metathesis (CM), acyclic diene metathesis polymerization (ADMET) and ring opening metathesis polymerization (ROMP).¹ Diverse ruthenium-based complexes can catalyze these transformations. Among those systems, N-heterocyclic (NHC) Ru complexes have emerged as the most versatile and efficient catalysts.²



Catalytic performances of new Ru-based complexes bearing saturated chiral NHC ligands in some standard RCM, CM and ROMP reaction are examined.



1. e.g. Grubbs, R.H. *Handbook of Metathesis*; Wiley-VCH: Weinheim, Germany, 2003 and references therein. Brancato, G.; Hoveyda, A.J.; Zhugralin, A. R. *Nature* **2007**, *450*, 243-251.

2. Tnaka, T.M.; Grubbs, R. H. *Acc. Chem. Res.* **2001**, *34*, 18-29.

INO-PO-30

Application of the Shvo Catalyst in Bio-oil Upgrading, Hydrogenation of Fast Pyrolysis Oil and Related Model Compounds

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In the development of renewable energy carriers an attractive biofuel is the bio-oil obtained from flash pyrolysis of lignocellulosic biomass.¹ The crude bio-oil (consisting of acids, aldehydes, ketones, up to 30% water and polymeric materials)² requires upgrading to improve its calorific value and storage stability. Hydrotreatment using classical heterogeneous catalysts or zeolites increases the calorific value of upgraded bio-oil.³ Acting in the same way recent developments show that homogeneous catalysts could be attractive alternatives as these operate at milder conditions.⁴ Here we report on application of the Shvo catalyst $[[3,4-(4-MeO-C_6H_4)_2-2,5-Ph_2(1^{\prime}-C_6CO)]_2]Ru_2(CO)(\mu-H)$, an efficient homogeneous hydrogenation catalyst, in the reduction of polar double bonds in model mixture (vanillin, cinnamaldehyde, 4-methyl-acetophenone, glycolaldehyde, acetal, acetic acid). The catalyst works with high conversions in acidic aqueous and organic model mixtures. Preliminary results obtained on a real matrix (bio-oil from poplar), show the reduction of polar double bonds, with increased stability.

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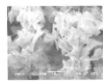
INO-PO-31

CuO/Ce_(1-x)Zr_xO₂ porous layered materials for the CO Preferential Oxidation

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Layered mixed oxides, consisting in a structure of stacked sheets, are very interesting materials with a tailoring nanodesign, controlled accessibility to the active sites and high surface area, and also show an interesting behaviour as catalysts. In this

work, the preparation of a series of CuO/Ce_(1-x)Zr_xO₂ porous layered materials is described. The samples were characterized by X-ray powder diffraction (XRPD), thermogravimetry (TGA-DTG), SEM microscopy, N₂ physisorption at 77 K, temperature-programmed reduction (H₂-TPR) and X-ray photoelectron spectroscopy (XPS). The activity of these layered materials was evaluated in the preferential oxidation of CO (CO-PROX)^{1,2} in hydrogen-rich gas stream (1.2% CO, 1.2% O₂, 50% H₂, 0-15% CO₂, 0-10% H₂O, He balance) and their catalytic performance was compared with that of a CuO-CeO₂ reference sample.³ Correlations between catalytic activity and physico-chemical properties of the materials were made.

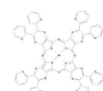
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INO-PO-32

Photocatalytic Degradation of 4-Nitrophenol by Pyrazinoporphyrazines Deposited on TiO₂ (anatase)

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The porphyrin macrocycle tetrakis-2,3-[5,6-di(2-pyridyl)pyrazino]porphyrin (abbr. as [Py₂TPyzPzH]) and its metal complexes [Py₂TPyzPzM] (M = Zn²⁺, Cu²⁺, Pd²⁺)¹ (Figure) adsorbed on TiO₂ (anatase) particles (Ø ≈ 170 nm) were proved able to significantly increment in the aqueous suspension the activity of pure TiO₂ in the photodegradation of 4-nitrophenol. The efficiency of the combined action macrocycle/TiO₂, higher than other studied related tetrapyrrolic analogs,² depends on the type of the porphyrinate core and follows the order: [LuCu]/TiO₂ > [LZn]/TiO₂ > [LPd]/TiO₂ > [LH₂]/TiO₂ > TiO₂ (L = Py₂TPyzPz²⁺).

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