Ionic Liquids:
Synthesis and Applications

New chiral ligands derived from biomass products:
Synthesis and Applications for Asymmetric Catalysis

Ionic Liquids and Catalysis

Research-Team leader: Prof. Giang VO-THANH

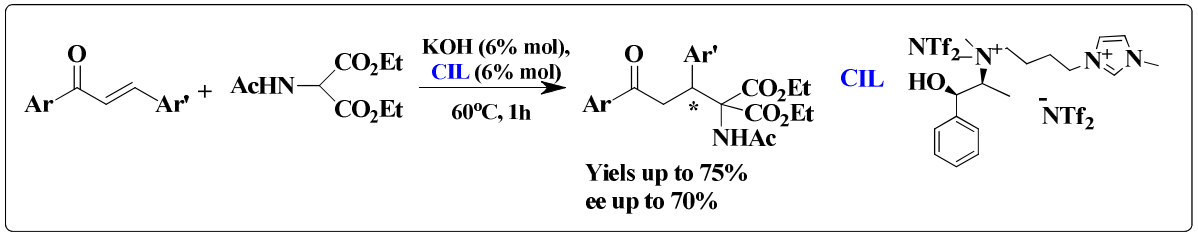
Organic synthesis using 'Green Chemistry' conditions:
Solvent-free synthesis under Microwave activation

N-Heterocyclic Carbenes:
Synthesis and Applications

Chiral Ionic Liquids: New reaction media (solvent and/or catalyst) for asymmetric synthesis and catalysis

[Giang Vo-Thanh (Prof.), Audrey Aupoix,Thu Truong (Ph.D students)]

Example: Synthesis of functionalized chiral ammonium and imidazolium-based ionic liquids derived from (-)-ephedrine using solvent-free microwave activation. Applications for the asymmetric Michael addition

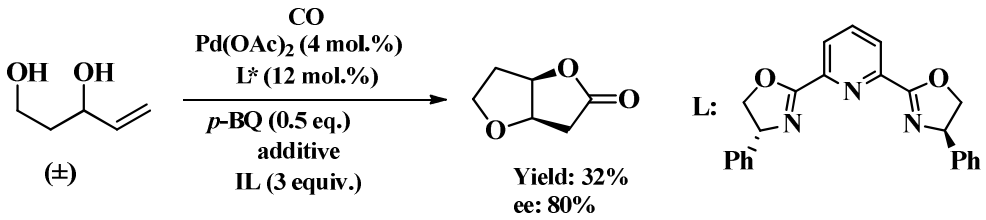


Tetrahedron, **2010**, *66*, 5277

Asymmetric intramolecular palladium (II)-catalyzed oxycarbonylation reaction in the presence of ionic liquid

[Giang Vo-Thanh (Prof.), Martial Toffano (Researcher, CNRS), Jana Dohanosova (Ph.D student)]
(*'Cotutelle Thesis' in collaboration with Prof. Tibor Gracza's group, University of Sciences and Technology , Bratislava, Slovakia, 2009-2102).*

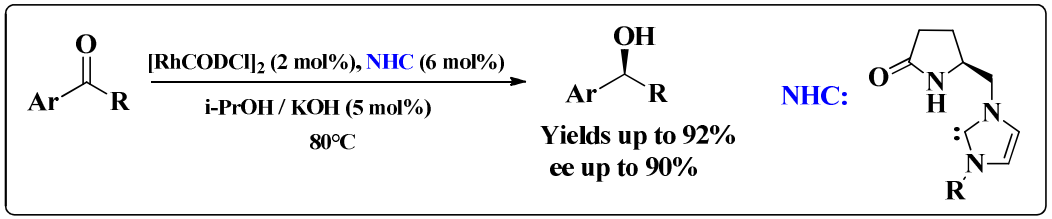
Example: asymmetric intramolecular palladium (II)-catalyzed oxycarbonylation (*best result has been reported so far*)



Chiral azolium salts as precursors to *N*-Heterocyclic Carbenes for asymmetric catalysis:

[Giang Vo-Thanh (Prof.), Chloée Bournaud (Assistant Prof.), Audrey Aupoix, Amélia Thomasset (Ph.D students)]

Example: Asymmetric transfer hydrogenation of aromatic ketone using rhodium complexes of chiral *N*-heterocyclic carbenes derived from (*S*)-pyroglutamic acid (the best enantioselectivity reported so far for a transfer hydrogenation catalyst incorporating a chiral NHC ligand).

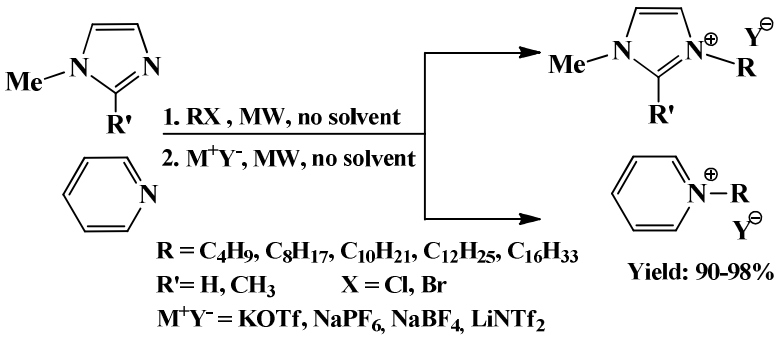


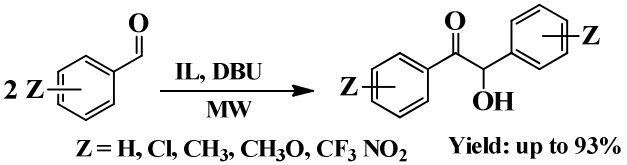
Eur. J. Org. Chem., **2011**, 2772

Organic synthesis under solvent-free microwaves activation conditions

[Giang Vo-Thanh (Prof.), Audrey Aupoix (Ph.D student)]

Example: Synthesis of imidazolium and pyridinium-based ionic liquids and applications of 1-alkyl-3-methyl imidazolium salts as pre-catalysts for the benzoin condensation using solvent-free microwave activation



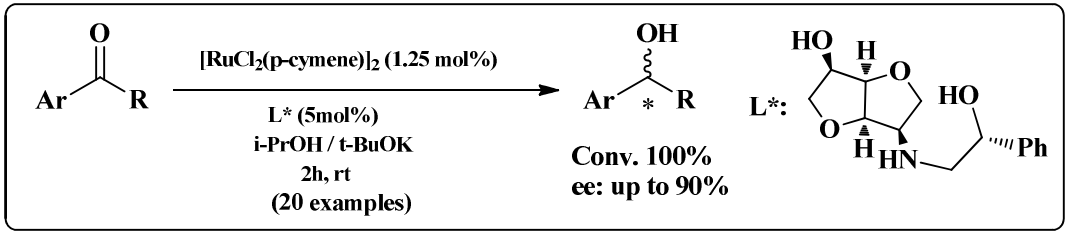


Tetrahedron, **2010**,*66*, 1352

Synthesis of new chiral ligands derived from isosorbide and isomannide (biomass products)

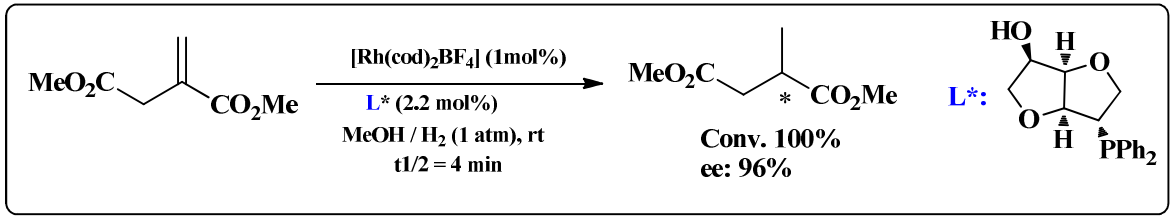
[Giang Vo-Thanh (Prof.), Martial Toffano (Researcher, CNRS), Chloée Bournaud (Assistant Prof.), Houssein Ibrahim, Khanh-Duy Huynh (Ph.D students), Delphine Kalch (Postdoctoral Associate)]

Example: Asymmetric transfer hydrogenation of aromatic ketones with amino-alcohol ligand



Tetrahedron: Asymmetry, **2010**, *21*, 1542

Example: Enantioselective hydrogenation with monophosphine ligand



New Journal Chem. **2011** (in press)

Synthesis of new chiral ligands or/and organocatalysts derived from natural chirality sources. Applications for asymmetric catalysis

[Giang Vo-Thanh (Prof.), Martial Toffano, Jérôme Hannedouche (Researchers, CNRS), Chloée Bournaud (Assistant Prof.), Huong Nguyen (Ph.D student)

Work in progress