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Book of ABSTRACTS

HYDROGENATION CATALYZED BY PHOSPHINOHYDRAZINE- Rh(I) COMPLEXES IN SC CO₂

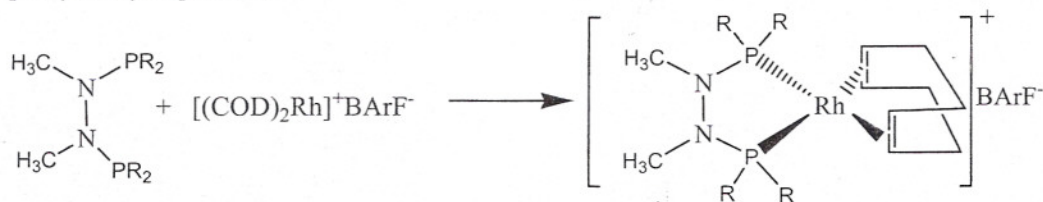
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Derivatives of phosphine ligands and their rhodium complexes have found important applications as catalysts with high yields. In recent years there has been increasing interest in using supercritical carbon dioxide (scCO₂) as the reaction medium for organic synthesis, because of the toxic effect of organic solvents^[1,2]. It is well known that fluorine groups attached to ligands increase their solubility in scCO₂.^[3] In this project we synthesized fluorinated derivatives of phosphine ligands and their rhodium complexes which are soluble and active catalyst for homogeneous reactions in scCO₂. Solubility of synthesized compounds in scCO₂ was measured at a pressure range of 1700 - 1900 psi in the temperature range of 313.15 - 363.15°K in windowed reactor. The perfluorinated derivatives of ligands provide significantly higher solubility in scCO₂ compared to the insoluble parent compounds. Hydrogenation reactions were performed in scCO₂ by charging a cylindrical stainless steel reactor (80 mL and 100 mL capacity) with catalyst and substrate (substrate/catalyst = 250) followed by pressurization with hydrogen gas (10 bar) and CO₂ (total pressure of 1750 psi) in the reaction period range of 3 hours.

[Rh(COD)Ln]BArF:



BArF: Tetrakis(bis 3,5-ditrifluoromethyl phenyl)borat

R----Ln: (n:1) = 3,5-(CF₃)₂C₆H₃

(n:2) = m-(1H,1H,2H,2H-perfluoroalkyl)phenyl

The effect of alkyl and hydrazine backbone on catalytic efficiency and solubility properties of fluoro methyl and perfluoroalkyl were investigated. As expected, the perfluorinated complexes show more solubility than fluorinated complexes in scCO₂, but they show low catalytic activity. The complexes that have hydrazine backbone shows more catalytic activity than alkyl derivatives due to the P-N bonds

[1] S. Haji, and C. Erkey, *Tetrahedron*. **2002**, 58, 3929 - 3941.

[2] G. Francio, W. Leitner, *Journal of Organometallic Chem.* **2001**, 621, 130 - 142.

[3] B. Güzel, M.A. Omary, J.P. Fackler, A. Akgerman, *Inorg. Chem. Acta*. **2001**, 325, 45 - 50.



Certificate of Attendance

This is to certify that

GUZEL, Bilgehan

attended the 16th International Symposium on Homogeneous Catalysis (ISHC-XVI), organized by the Institute of Chemistry of Organometallic Compounds (ICCOM) of the Italian National Research Council (CNR) held in Florence (ITALY) from July 6th to July 11th 2008.

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