

2-(3-Pyrazolyl)pyridines as Ligands in the Ruthenium Catalysed Hydrogenation of Carbon Dioxide

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Abstract

We present here, ruthenium based catalysts^[1] with pyrazolylpyridine ligands for the catalytic hydrogenation of CO₂ to formic acid derivatives.^[2] These ligands have already shown promising results in other catalytic transformations^[3] that have been investigated in our group. A series of different ruthenium(II)phosphine complexes such as RuCl₂(dppe)₂, RuCl₂(PPh₃)₄ had been used as catalyst precursors in the past.^[4] We synthesized air stable RuCl₂(PPh₃)₂(pyrazolylpyridine) (Figure 1) by simple ligand exchange. In a recent step we enhanced the activity of the system by substitution of the triphenylphosphine with less sterical demanding trimethylphosphine. Furthermore, the development of a simplified catalyst screening process, as well as a proposition of the hydrogenation mechanism will be presented.

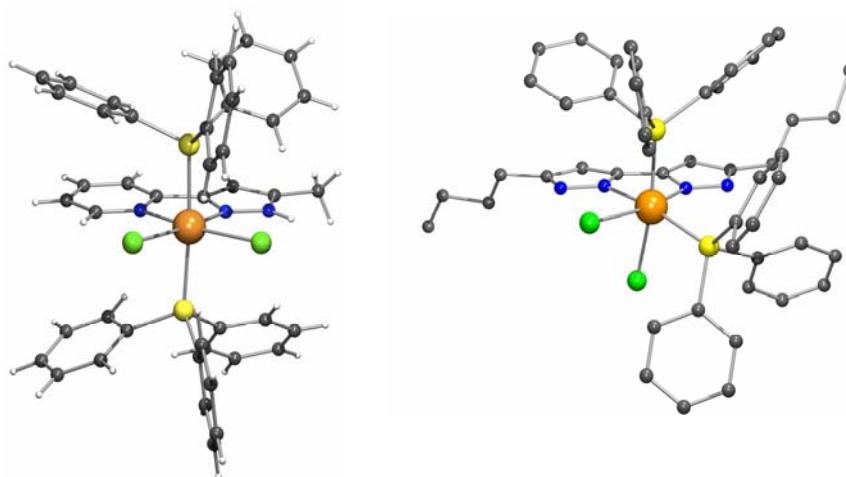


Figure 1: RuCl₂(PPh₃)₂(2-(5-methylpyrazol-3-yl)pyridine) and RuCl₂(PPh₃)₂(bis-(5-butyl-3-pyrazolyl))

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