

New ruthenium complexes bearing phosphinous acids as ligands: synthesis and applications in catalysis

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How to apply: *To carry out this project, the candidate must have a good background in organic chemistry (a Master is required) and some experience in organometallic catalysis and/or transition metal complexes synthesis with strong technical skills. To apply, the candidate will send by e-mail to herve.clavier@univ-cezanne.fr and gerard.buono@univ-cezanne.fr. : a detailed curriculum - a motivation letter - the report with the master marks - and at least one recommendation letter.*

Thesis subject: Due to a wide range of oxidation states, ruthenium complexes show a unique diversity of catalytic reaction for the formation of C-C and C-heteroatom bonds. Spanning steric and electronic parameters of ligands bearing a metal center may control catalytic processes and their outcomes. In this context, phosphinous acids appeared as a promising class of ligands for the development of transition metal-mediated transformations. For example, few complexes of palladium and platinum have been synthesized in our laboratory leading to interesting applications in catalysis, however ruthenium complexes have been barely investigated to date. Thus, this thesis aims to examine the synthesis of ruthenium-based complexes incorporating two or more phosphinous acids.

The performances in catalysis of the new complexes will be then evaluated for cycloisomerization and cycloaddition reactions. Moreover we wish to develop new reactions using ruthenium to generate metal-vinylidene species from alkynes. Enantioselective versions of these transformations will be also investigated.