



## Sinchem 2016 doctoral research subject

### Innovative Heterobimetallic Catalysts for Cooperative C-H bond Activation

**Project:** Catalysis is an essential tool of sustainable development, improving chemical industry's competitiveness, while minimizing its environmental impact. The direct activation of carbon-hydrogen (C-H) bonds by organometallic catalysts could substantially impact the feedstock pool for tomorrow's industry, allowing for the catalytic conversion of abundant alkanes into valuable functionalized organic compounds or the direct functionalization of organic products in an atom-efficient fashion.

A current frontier area in organometallic catalysis is cooperative activity between two distinct metals in order to lead to new transformations not possible with monometallic species. In particular, metal-metal synergistic effects are promising to promote the heterolytic cleavage of unactivated C-H bonds and opens attractive opportunities for unprecedented reactivity in catalysis.

This thesis will therefore focus on the development of original well-defined and unprecedented heterobimetallic organometallic supported complexes and on the understanding of their synergistic behavior. Its chemical foundation is the original surface organometallic chemistry, mastered by the Lyon 1 team, which will be applied to isolate well-defined heterobimetallic entities on oxide supports. The molecular modelling (experimental or computational) of structures and their catalytic activity of the resulting new materials will be performed also at RWTHAachen, world leader in the fields of catalysis and green chemistry.

**Candidate:** The ideal candidate will have a solid background in molecular chemistry and synthesis and at least two of the following three fields: organometallic chemistry, organic synthesis and/or catalysis.

**Supervisors:**

**in LYON (France - HOME Location):** Dr. E.A. QUADRELLI and Dr. Clément CAMP (LYON 1 university – C2P2 Unit (UMR 5265 CPE-CNRS-Unily1)

**in Aachen (Germany - HOST Location):** Prof. Walter LEITNER (RWTH)

**in LYON (France - ASSOCIATE Location):** (IRCELYON).