

# Invitation à la soutenance publique de thèse

Pour l'obtention du grade de Docteur en Sciences

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Master en sciences chimiques

## Synthesis of water-soluble molecular clusters and their application in catalysis

Water-soluble organometallic complexes have attracted much attention due to their applications as antitumoral compounds, catalysts or nanoparticle precursors. More particularly, on the one hand, aqueous/organic two-phase systems are very appealing as they allow an easy catalyst recovery and recycling. On the other hand, the solvent of impregnation to form heterogeneous catalysts and metal/support interactions is primordial to allow small and well dispersed nanoparticles.

This work deals with the synthesis of new water-soluble ruthenium-based clusters (*i.e.* species comprising at least three metal atoms in their core bound by minimum two metal-metal bonds). In total, twenty-two new clusters were synthesized and fully characterized, nine of which are soluble in water. They were impregnated onto carbon nanofibers and nanotubes in water at a controlled pH. Two adsorption mechanisms are taking place, leading to particles with a bimodal size distribution if activated at high temperature. The prepared heterogeneous catalysts were tested in cinnamaldehyde hydrogenation and led to a majority of the thermodynamically unfavoured product. Various factors, such as support, particle size or addition of a second metal were seen to have an influence on the selectivity. One cluster was tested in the same reaction but under biphasic conditions and only the thermodynamically favoured product was produced.

**Vendredi 28 octobre 2016 à 15h00**

Auditoire LAVO 51  
Bâtiment Lavoisier  
Place Louis Pasteur, 1  
1348 Louvain-la-Neuve



### Membres du jury :

Prof. Sophie Hermans (UCL), promoteur  
Prof. Eric Gaigneaux (UCL), président  
Prof. Olivier Riant (UCL), secrétaire  
Prof. Stefano Zacchini (Università di Bologna, Italie)  
Prof. Vincent Dubois (Institut Meurice, Belgique)  
Prof. Michel Devillers (UCL)