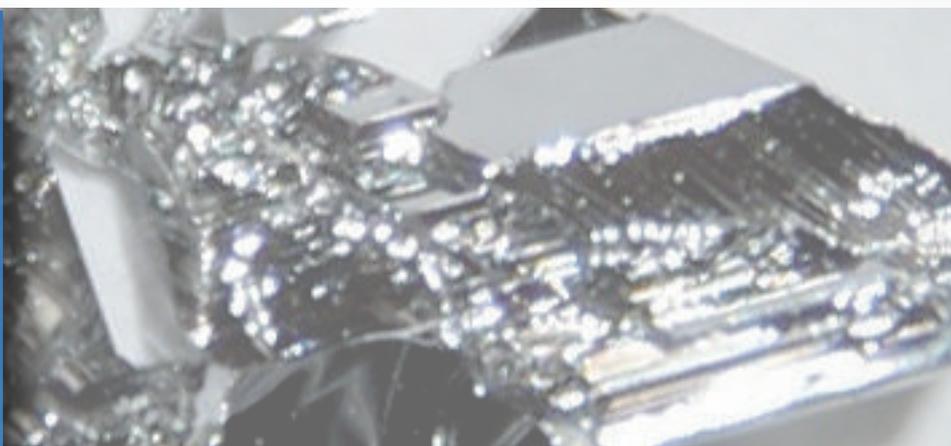


# Ruthenium and Osmium Cluster Complexes Derived from N-Heterocyclic Silylenes, Germylenes and Stannylenes



## PROJECT DETAILS

Funding Programme:  
7th Framework Programme  
(FP7)

Sub-Programme:  
People

Funding Scheme:  
European Re-integration  
Grants (ERG)

Project Reference:  
268329;  
UE-10-POLYRUO-268329

Project Duration:  
36 Months (from 2010-09-01  
to 2013-08-31)

Total Project Value:  
€ 45.000

EU Grant-Aid:  
€ 45.000

Funding to UniOvi:  
€ 45.000

Website:  
[http://cordis.europa.eu/project/rcn/96132\\_en.html](http://cordis.europa.eu/project/rcn/96132_en.html)

## PROJECT DESCRIPTION

The purpose of this project is to extend the chemistry of ruthenium and osmium clusters derived from N-heterocyclic carbenes (NHC) to the silicon, germanium and tin analogues (NHM, M = Si, Ge, Sn). The interest of this proposal is based on: (a) the absence of this kind of polymetallic compounds, (b) the interesting Ru<sub>3</sub>-NHC and Os<sub>3</sub>-NHC chemistry reported recently by Cabeza, Whittlesey, Cooke and Cole, amongst others, which cannot be replicated by mononuclear derivatives, and (c) the fact that Ru-NHC complexes are among the most active catalysts for key reactions in organic syntheses; for example olefin metathesis (including ring opening and closing processes) and a battery of cross-coupling reactions (Heck, Suzuki, Sonogashira, Stille and Kumada). The project will be divided in two main parts: (A) Stoichiometric reactions, including studies on: (i) the synthesis and characterisation of new Ru-NHM and Os-NHM cluster complexes, (ii) the ability of NHM ligands to promote intramolecular C-H, C-C, C-N, Si-N, Ge-N and Sn-N bond activations, (iii) the reactivity of the aforementioned derivatives toward unsaturated organic substrates, aiming C-C, C-N and M-heteroatom coupling reactions to form novel functionalised organic molecules, and (iv) theoretical calculations (DFT) to rationalize the transformations observed; and (B) Catalytic processes (olefin metathesis and coupling reactions) using the complexes outlined in part A or modified systems containing hemilabile ligands, able to promote the necessary coordination vacancies onto which the organic substrates can be fixed and transformed. This work will be developed in Cabeza's Organometallic Cluster group (University of Oviedo-Spain), which its great experience in the area of ruthenium and osmium carbonyl clusters (derived from N-donor and NHC ligands), along with the promising possibilities that the fusion of NHM ligands and polymetallic compounds offer, provides all the necessary ingredients for a successful project.

## UNIOVI TEAM

Javier Ángel Cabeza de Marco ,  
[jac@uniovi.es](mailto:jac@uniovi.es)  
Pablo García Álvarez ,  
[pablofabero@hotmail.com](mailto:pablofabero@hotmail.com)

, Department of Organic and Inorganic  
Chemistry

## PROJECT PARTNERS

Project Coordinator  
Universidad de Oviedo, Spain