

Coordination chemistry of the alkaline earths and applications in catalysed dehydropolymerisations

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Our team is composed of 4 permanent researchers, 12 PhD students and post-doctoral research assistants and works in close collaboration with industrial partners. Our expertise lies in the design, synthesis and implementation of molecular organometallic catalysts for atom-efficient reactions.

We are seeking to recruit a highly motivated PhD student, starting on October, 1st 2017 or as soon as possible thereafter, to continue our existing program in the area of alkaline-earth chemistry.¹ The chemistry of these elements is still in its infancy, many key compounds remained to be synthesised and characterised, and the range of potential applications in catalysis is virtually boundless. The project consists in exploring specific aspects of the challenging synthetic coordination chemistry of the large alkaline-earth metals (calcium, strontium and barium) with a view to producing highly competent catalysts for dehydrocoupling catalysis. The tasks of the recruited PhD student will consist in:

- (i) tackling the synthesis of elusive alkaline-earth complexes, e.g. hydrido and peroxy complexes. The design of ancillary ligands will be an important task towards the fulfilment of these ambitious targets;
- (ii) implementing them in dehydropolymerisation catalysis to produce macromolecular materials, including inorganic and hybrid polymers, featuring new properties such as flame retardancy or resistance to hydrolysis, upon formation of Si–N and Si–P chemical bonds. Parts of the research will be conducted jointly with teams in Lyon (Dr. F. Ganachaud, silicone polymers) and Alès (flame retardant effects).

The successful applicant, who must have a good command of the English language, will gain a set of complementary competences in organometallic synthesis under controlled atmosphere, alkaline-earth chemistry, catalysis science, polymer chemistry, and the characterisation (1- and 2D-NMR, FTIR, X-ray diffraction crystallography, gel permeation chromatography, GC chromatography, MALDI-ToF mass spectrometry etc.) of molecular and macromolecular compounds. An experience in the handling of air-sensitive species and a pronounced flair for synthetic coordination chemistry will be an advantage. The 3-year fully funded project (ANR grant POLCADE, neat salary ca. 1,400 € per month; status University employee) will run from 2017 to 2020.

1 (a) Y. Sarazin, B. Liu, T. Roisnel, L. Maron, J.-F. Carpentier, *J. Am. Chem. Soc.* **2011**, *133*, 9069. (b) B. Liu, T. Roisnel, J.-F. Carpentier, Y. Sarazin, *Angew. Chem. Int. Ed.* **2012**, *51*, 4943. (c) C. Bellini, J.-F. Carpentier, S. Tobisch, Y. Sarazin, *Angew. Chem. Int. Ed.* **2015**, *54*, 7679. (d) C. Bellini, V. Dorcet, J.-F. Carpentier, S. Tobisch, Y. Sarazin, *Chem. Eur. J.* **2016**, *22*, 4564. (e) C. Bellini, C. Orione, J.-F. Carpentier, Y. Sarazin, *Angew. Chem. Int. Ed.* **2016**, *55*, 3744. (f) C. Bellini, T. Roisnel, J.-F. Carpentier, S. Tobisch, Y. Sarazin, *Chem. Eur. J.* **2016**, *22*, 15733.