

Multi-phase Organometallic Chemistry: Early Transition-Metal Pincer Complexes for Small Molecule Upgrading

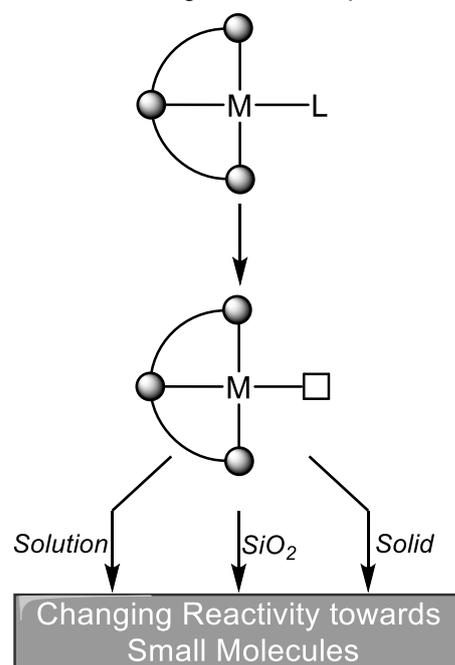
Applications are sought for a fully funded 3-year studentship in **organometallic chemistry**. The successful candidate will be supervised by Dr F. Mark Chadwick at the Department of Chemistry, Imperial College London, starting Autumn 2019. The department is world-leading in chemical research and has just moved to a new state-of-the-art building (the Molecular Sciences Research Hub) in White City, London.

Project

The selective conversion of abundant small molecules (e.g. CO₂, N₂, H₂) remains of paramount importance and interest to chemists. For many transformations, the conversion of unwanted and unused gaseous compounds to useful feedstock chemicals is thermodynamically favourable. For example, the conversion of CH₄ to MeOH with O₂ is exoergic, however overoxidation to CO₂ and H₂O is even more so. Similarly, the conversion of CO₂ to MeOH or Me₂O using H₂ gas can again be made thermodynamically favourable, but the widespread adoption of a suitable technology to halt the rise of this greenhouse gas has not happened.

Industrially, the conversion of these simple molecules is generally carried out using heterogeneous catalysts. These have the advantage of product/catalyst separation - yet often at the cost of activity and/or selectivity. Conversely the development of homogeneous transition-metal catalysts that can effect these transformations remains a challenge.

This research project will involve the synthesis of a new family of, low-valent, group 4 pincer compounds. The reactivity of these complexes with small molecules will be studied using state-of-the-art spectroscopic techniques, looking towards new catalytic conversions. Many of these complexes are anticipated to be highly unsaturated and, therefore, highly reactive. To avoid undesirable side reactions the complexes will also be grafted onto solid supports (silica) and studied in the pure solid state (single-crystal reactivity). The project will combine a significant amount of blue sky synthesis, with subsequent application to real-world problems.



Eligibility and Funding

The position would suit an ambitious and highly motivated researcher with interests in organometallic chemistry and catalysis. A strong background in air-sensitive synthetic chemistry is extremely desirable, with relevant previous research experience in academic laboratories essential. The chosen candidate will receive a full tax-free stipend for 3 years (currently £16,777 p.a.). Funding is guaranteed; however, the successful applicant will also be expected to enter into the competitive, highly prestigious Doctoral Training Partnership scheme. Applicants should hold (or expect to be awarded) a Class 1 Master's degree (MSci, MChem) in Chemistry.

How to Apply

Interested candidates are encouraged to make contact a.s.a.p. with Dr F. Mark Chadwick by email (m.chadwick@imperial.ac.uk), with a cover letter (including details of your research experience), an up-to-date CV (2-pages), and the names and contact details of two referees.

Formal applications should be made through the Imperial College online application process, which can be accessed [here](#). Please make reference to the above project title in the *Proposed Research Topic* field. Short-listed candidates will be required to attend an interview in person at Imperial College London, which will be held in early January 2019. **Notification of decisions on applications will be rapid, and are expected by February 2019.**