

Proposal for a joint French-Australian PhD program

We are currently seeking a candidate for a joint PhD program between the University of Rennes and the Australian National University (ANU), for which funding (Lumomat/ANU) has been secured. Upon completion of their PhD, the candidate will hold a dual degree (ANU and UR1).

We are looking for a candidate primarily interested in organic and organometallic synthesis, and keen to develop molecules with potential applications in phototherapy.¹ This project is part of a long-standing collaboration (CNRS IRP Program) between our group and that of Mark G. Humphrey (see website addresses below).² The PhD project focuses on the fabrication of organic (or organometallic) two-photon absorbers based on triarylcarbenium carbocations. It can be adapted to the candidate's organic/organometallic background. The aim is to develop new two-photon excitable molecules with potential applications in cancer treatment, molecular imaging, and theranostics. The initial research will focus on octupolar organic/organometallic assemblies,³ centered around triarylcarbenium motif (e.g. **MG⁺**, **BG⁺** below), known to be good two-photon absorbers, non-emissive (or photothermal molecules).⁴ The candidate will then be required to characterize the absorption and photothermal properties at one and two photons using state-of-the-art equipment under laser irradiation. Through further collaborations, this project could be extended to studies in biological environments.

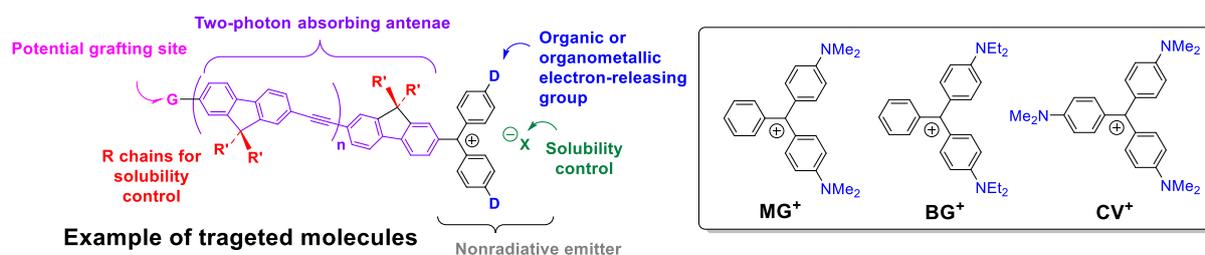


Figure 1

This joint supervision agreement means that the candidate will spend eighteen months in France and eighteen months in Australia; therefore, they must be proficient in English. In this regard, ANU requires (before enrollment) that the candidate has successfully passed an English proficiency test. Furthermore, a grade of "good" in the second year of the Master's program (M2) is required to apply. Finally, it should be noted that ANU, located in Canberra, Australia, is one of the country's most prestigious universities. This doctoral project, while allowing the candidate to obtain a dual PhD degree—Australian (ANU) and French (UR1)—will also enable them to become familiar with Australian culture and further develop their English skills. Interested candidates are asked to contact F. Camerel (franck.camerel@univ-rennes.fr) or F. Paul (frederic.paul@univ-rennes.fr) and to send us a CV, a cover letter and their Master's degree transcripts.

For the Australian group of M.G. Humphrey, see: <https://chemistry.anu.edu.au/people/prof-mark-humphrey>

F. Camerel and F. Paul

¹ F. Camerel, M. Fourmigué, *Eur. J. Inorg. Chem.* **2020**, (6), 508-522

² G. Grelaud, M.P. Cifuentes, F. Paul, M.G. Humphrey, *J. Organomet. Chem.* **2014**, 751, 181.

³ V. Cherruault, F. Camerel, J. Morin A. Triadon, N. Godin, R. Lefort, O. Mongin, J.-F. Bergamini, A. Vacher, M.G. Humphrey, M. Lorenc, F. Paul, T. Pezeril, *J. Chem. Phys.* **2025**, 163, 024201.

⁴ G. Indig, D. G. Jay, J. J. Grabowski, *Biophys. J.* **1992**, 61, 631-638.