Master 1 / 2 Internship offer

Team. Laboratoire des Systèmes Complexes Hors Equilibre (www.hermanslab.com; hermans@unistra.fr; 8 allee Gaspard Monge, 67000 Strasbourg, France)

Key words. Organic synthesis – Flow chemistry – Liquid tube technology – Solid handling

Context. Our team has invented wall-less microfluidic devices based on permanent magnets and ferrofluids, which can replace traditional solid wall analogs to flow, pump, valve, mix, etc. A unique benefit is that our technology is able to handle solids without clogging. The technology is based on the confinement of a diamagnetic liquid inside a ferrofluid (magnetic liquid) held by a magnetic quadrupole. Recently, microreactors for flow chemistry have been developed by the group to allow (for the first time) the use of solid catalysts (slurries) or precipitations in flow chemistry (without clogging the channels). The non-clogging capacity of those microreactors due to the liquid-in-liquid confinement is very interesting to perform organometallic reactions where salts are very often reaction by-products.

Subject. The purpose of this internship is to use liquid tube based microreactor prototypes developed by our group to realize and optimize most organometallic reactions such as:

- Grignard reaction
- Buchwald-Hartwig reaction
- Lithiation

First the intern will establish the capacity of different microreactors to perform organometallic reactions and characterize potential reaction by-products.

Then, by adjusting different parameters (residency time, temperature, choice of magnetic liquid) the intern will optimize each reaction.

Candidate skills. We are looking for a candidate with skills in:

- Organic synthesis
- NMR
- English (mandatory)
- ICP-AAS is a plus

Conditions. Master students can start at any time in 2022 and come for a minimum of 3 months and a maximum of 9 months. The student will receive the standard master student stipend (for master level 2 students > 4 months).

Key references. **https://rdcu.be/b3ZuF** & **https://doi.org/10.1021/acs.langmuir.1c02617**