

FINAL MASTER PROJECT PROPOSAL



Title

Microfluidic approach to the green synthesis of covalent organic frameworks

Supervisor(s)

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Summary of the project

Covalent organic frameworks (COFs) are totally organic compounds possessing crystallinity and high microporosity and thermal stability. These materials are prepared through reversible condensation reactions such Schiff base reactions. COFs can be applied to different fields such as catalysis, molecular separations by adsorption and membranes, and encapsulation for several purposes, among others. This is the reason because it is important to find new strategies to ease the synthesis of these materials, even making it greener, simultaneously improving the control of their particle size and textural features.

This work will investigate on the microfluidics based synthesis of COFs focusing on room temperature routes using water as solvent instead of typical harm solvents (DMF, etc.). The concept of water-based COF synthesis has only a recent precedent (at 120 °C for 3 d, IUCrJ (2016). 3, 402–407) and the goal of the current TFM proposal will be to combine these recent findings with the microfluidics approach trying to reduce both temperature and synthesis duration. Once chosen the best COF system for the study based on the availability of monomers, the obtained materials will be characterized by X-ray diffraction, N₂ adsorption, FTIR and Vis-UV spectroscopies, thermogravimetric analysis and scanning and transmission electronic microscopies, among others. Finally, MAUD will be used to analyze the structures achieved.