

PhD project: Development of a continuous mode (micro-)separation device

Duration: 4y

Start: 1/6/19 (Brussels/B and Enschede/NL)

The 21st century is developing such that society relies ever and ever more on (bio-)chemical measurements of fluids and matrices. By shaping microfabricated silicon-based pillar arrays, our group has during the past years drastically changed the separation capabilities and perspectives of analytical separation devices, allowing for an analytical batch type of separation of thousands of component types in single run. Next to analytical separations, there is a stringent need to perform continuous separations of molecules of interest, e.g. as a purification step of a medicine of interest so that it can be safely administered to the patient. In a reaction engineering context, it is also interesting to immediately remove products from a reagent stream during a reaction to minimize energy consumption and positively influence chemical conversion. Unfortunately, there is no continuous analogue of chromatography, capable of separating several types of small molecules in continuous mode. In the present project, such a continuous HPLC mode device is developed.

The research will take place predominantly at the Free University of Brussels (VUB, promotor: Prof. Wim De Malsche), in close interaction (with min. 25 % research stays) with the Mesa+ Institute for Nanotechnology (UTwente) in Enschede, The Netherlands (promotor: Prof. Han Gardeniers).

Job description

Your work will have both an experimental and a modeling character. You will design and fabricate silicon and glass separation devices. You will develop electrochemical anodization protocols to increase the specific surface of the devices on innovative configurations. You will study devices that have been fabricated in a state-of-the-art cleanroom on setups that you will develop. You will also be involved in the demonstration of proof-of-concepts of improved efficiencies of miniaturized reactors. This dynamic atmosphere of the group and consortium will enable you to make important contributions on both the fundamental physics side as on the application side. You will interact with and present your results to a network of industrial and academic partners involved in other aspects of the project.

Your profile

You have a Master's degree in physics, electrical, biomedical or chemical engineering and you are interested in microfluidics, microfabrication and material engineering, separations and reactors. You are creative, are comfortable with both experimental and theoretical work, can function independently and are willing to travel frequently between The Netherlands and Belgium. We expect the candidate to have an excellent command of the English language as well as professional communication and presentation skills. You will obtain a double PhD degree (VUB and Twente University).

Interested? Contact Prof. Wim De Malsche (wim.de.malsche@vub.be)