

Group : Microfluidics and Biosensors
Project : **Better emulsions for a better quality of life**
Supervisors : Ai Nguyen and Jacob Baggerman

Keywords: membrane emulsification, micro-engineered membranes, surface modification, emulsion

Introduction

Emulsification is a well-known technique, as it plays an important role for the production of food such as artificial milks, margarines, mayonnaise etc. In addition, it is also of increasing importance for the nutraceutical delivery of functional foods and pharmaceutical drug delivery. While the fundamentals have been explored already for decades, recently, microengineered membranes have emerged as a powerful technique to create *highly uniform* droplets with *high throughput*. The droplets size and structure of the emulsion can be tailored by tuning the morphology of the membrane; this uses microengineering (Figure 1) and process parameters such as flowrate, surfactants, and surface properties. This combination allows the development of advanced droplet microfluidics.

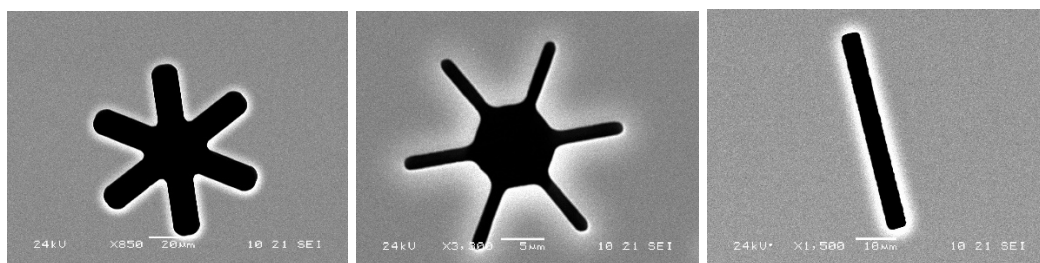


Figure 1. A few examples of pore morphology of micro-engineered membranes

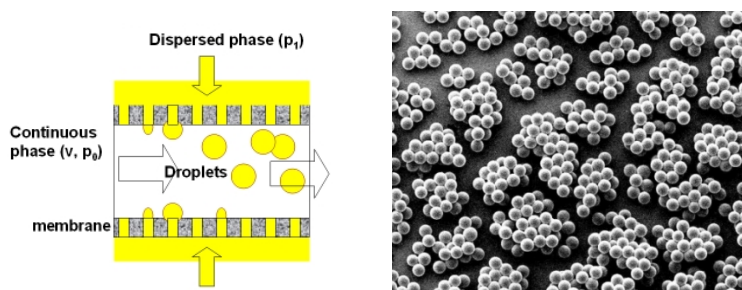


Figure 2: A principle of crossflow emulsification (left) and monodisperse PLA microspheres (10 micron-diameter) made using micro-engineered membrane emulsification¹

Goal

The aim of this project is to study the influence of the morphology of innovative membrane designs (pore shapes and sizes) and process parameters such as flowrates, surfactants, surface modification to obtain new emulsion formulations.

Techniques to be used

Surface modification, optical microscopy, microfluidics, SEM, XPS.

For more information

Dr. Ai Nguyen, Helix, office 7035
Dr. Jacob Baggerman, Helix, office 7035

ai.nguyen@wur.nl
jacob.baggerman@wur.nl

¹<https://www.aquamarijn.nl>
