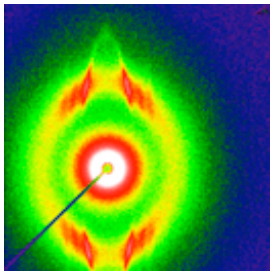

Contribution ID: **7** Type: **not specified**

Keynote 10 - Phase Mapping with Microfluidic-SANS and Predictive Design of Polymeric Microcapsules

Wednesday 12 December 2018 09:00 (40 minutes)

Microfluidics provides an exceptional platform for the generation of polymer solution droplets and their subsequent manipulation. We describe the formation of polymeric particles and capsules induced by solvent extraction, with broad applications in the pharmaceutical and consumer good industries. A microflow approach to perform small angle neutron scattering (SANS) and phase mapping of multicomponent liquid mixtures is first described, and the development of reconfigurable microfluidic-SANS. By contrast with conventional techniques, our approach continually varies solution composition during SANS acquisition, enabling global fits of large, constrained datasets, leading to unprecedented robustness and precision. After establishing the phase diagram of model polymer and colloidal solutions, we obtain a capsule morphology diagram, attaining internal morphologies encompassing nucleated and bicontinuous microstructures, as well as isotropic and non-isotropic external shapes. Equipped with this knowledge, we design and fabricate composite capsules and particles with prescribed structure and pulsed release profile, with time scales tunable from seconds to hours.

Presenter: Prof. CABRAL, Joao (Dept. of Chemical Engineering, Imperial College London, UK)

Session Classification: Early morning session - Associated systems