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Conferencia:

Microfluidics meet supramolecular chemistry: dynamic encapsulations

Ziyi Yu

University of Cambridge – Reuni Unido

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Aula de Seminarios do CIQUS

12:15h

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Short biography: Dr. Ziyi Yu studied Polymer Materials Science and Engineering at the University of YangZhou (China), then move to Nanjing Tech University, where he had his PhD with Prof. Su Chen to explore the formation of colloidal crystals in microfluidic droplets. After finishing PhD in 2012, he joined Prof. Chris Abell group at University of Cambridge (UK) as a postdoctoral research associate, working on applying microfluidic droplets as an experimental platform for supramolecular chemistry and cells biology. Since 2019, Dr. Yu starts to lead a research group in State Key Laboratory of Materials-Oriented Chemical Engineering at Nanjing Tech University (China), focusing on using microfluidics to develop engineered living materials.

Talk title and abstract:

Microfluidics meet supramolecular chemistry: dynamic encapsulations

Ziyi Yu

zy251@cam.ac.uk

Department of Chemistry, University of Cambridge, UK

Abstract

The dynamic nature of supramolecular complexes has been extensively studied due to their advanced properties including self-healing, structural modulation and controlled reorganization. However, the traditional control over the assembly relies on the recognition of the building blocks for targeting of the thermodynamic equilibrium state. Here, we show how the physical interfacial conditions offered by droplet-based microfluidics can be advantageously applied to rational control the supramolecular assembly at interfaces, resulting unprecedented non-equilibrium structures and dynamic encapsulations, as well as the emergence of novel material functions and applications. (1) The formation of triblock copolymer vesicles in microfluidic droplets will be discussed and their encapsulation of single cells for high throughput analysis and screening will be highlighted. (2) By integrating the cucurbit[8]uril-mediated host-guest chemistry, the preparation of supramolecular microcapsules will be presented and the dynamic release of the payload will be demonstrated. The results achieved will be used to confirm that droplet-based microfluidic technique is an invaluable toolbox technology for steering supramolecular assembly pathways to required structures, properties and functions, and will undoubtedly play a vital role in the chemistry, biology and material research fields.

References:

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