



Ca' Foscari
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Interconnected macroporosity tailoring within confined spaces: **MICROSCAFS®**

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Room Delta 1B, Scientific Campus Via Torino 155,
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Creating an interconnected network of both macropores and mesopores within hybrid or inorganic materials makes them attractive across different applications. The challenge arises when tailoring these features within confined spaces, i.e. within the water droplets of a water-in-oil microemulsion, and without the use of specific gelation additives, or porogens, while keeping reproducibility standards. This lecture focuses on an adapted sol-gel process combined with phase separation by spinodal decomposition, optimized for the creation of meso- and macroporous microspheres of multicomponent oxide composition, of brand name MICROSCAFS®. An insight of their step-by-step formation process is given, as well as the influence

of varied reaction parameters on the MICROSCAFS® morphology and the effect of replacing standard silicon alkoxides by alternative waste sources namely rice husk silica in their production, aligning with principles of circular economy and sustainability. Their potential application, with emphasis on solar light-driven photocatalytic water purification, will be described, targeting real-life application set-ups. Besides the above aspects, I will refer in this lecture how sol-gel science and technology have been present in my career pathway from University to the Industry, and then back to the Academia with the settlement of the Technology Platform on Microencapsulation and Immobilization (TPMI).