

Jan. 1st 2016 - 18 Months postdoctoral position available at Limoges University

Development of smart microfluidic micro reactors for colloidal material synthesis and structuring:

Keywords : **Microfluidic and microsystems technology, colloidal chemistry, nano-structured material synthesis**

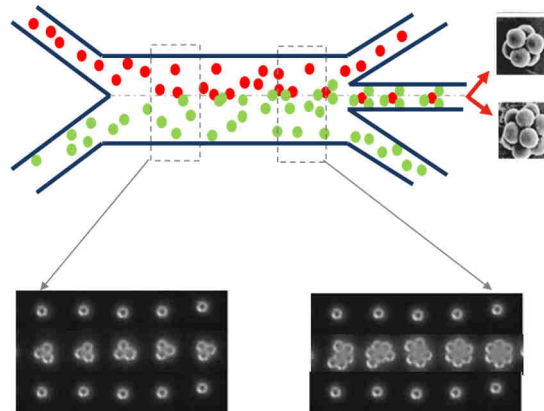
Context and background: With the advent of low-cost 3D printers, Additive Manufacturing (AM) technologies current development might prepare the next industrial revolution according to what some specialists claim. Indeed AM process should supplant traditional machining technics quite soon, using a material structuration and deposition, layer-by-layer with the capability to make complex 3D objects without the need for molds, tools or dies of any kind. Just like deposition technologies are becoming more and more efficient for accurate and fast complex objects manufacture, material synthesis/ structuration, currently focused on which a lot of research efforts, turns out to be the key of next innovations. Especially complex materials with specific properties as 2D material or colloids aggregates based ones, could become very attractive

for Additive Manufacturing purposes particularly if their synthesis and structuring can be mastered during the material deposition.

The **SPCTS** lab, part of the European Center of Ceramic (CEC), has developed a strong expertise on synthesis processes using colloidal oxide or ceramic material starting from nano-powder production, colloid dispersion in liquid phase, dedicated suspension formulation with appropriated additives in order to control particle aggregation (<http://www.unilim.fr/spcts/-Suspensions-et-Procédes-.html>). The SPCTS has also develop simulation tools based on Brownian Dynamics and Stochastic Rotation Dynamics algorithms to model and predict the potential material structure all along the aggregation process. From its side, the **XLIM** Research Institute owns an important background on micro&nano system research topics taking advantage of devoted cleanroom fabrication facilities and associated characterization capabilities (<http://www.xlim.fr/en/platinom/components-and-devices#technology>). Hence since a couple of years, XLIM is working on microfluidic device technologies, developing dedicated fabrication process for biosensor purposes.

Though the research project associated to this postdoc position, the two labs ambition is to develop original reactors using microfluidic technologies for colloidal material on-chip synthesis and nano-structuring with controlled and reversible aggregation capabilities.

Description of work: The project is supported by the Laboratory of excellence (under a grant of the French Ministry of Higher Education and Research). Σ LIM associate the two main academic labs of Limoges University: CNRS UMR7252 laboratory ([XLIM](#)) and the CNRS UMR7315 laboratory ([SPCTS](#)), both located on the Limoges city (France). The work aims at designing and fabricating microfluidics microreactors to generate cluster of particles at the interface of laminar flows of colloidal solutions, studying the aggregation kinetic in such microsystems relying on experiments based on labeled particles with fluorescent dyes and providing inputs for dynamic simulation model.



The selected candidate will also work on the development of methodologies to stimulate some kind of smart aggregation between colloids with an accurate control of cluster shape and morphology. Hence, he will have implement thermal, electrical or optical stimulators on chip in order to structure the material in-situ (inside microfluidic channels) with the capability to exploit reversible aggregation phenomenon. This work requires multidisciplinary competencies and will be led in a local consortium of chemists, physicist, material science engineers and microelectronic engineers.

Duration: 18 months appointment available from 1st January 2016

Salary: ~2200€ net/month

Location: Limoges (France)

Requested qualification: Ph.D. in micro-engineering or material science with good background in microfluidic technologies, experience in cleanroom fabrication is expected.

Contact: Please send your resume and a motivation letter by email to:

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