Our team has developed a simple and innovative process to easily obtain nanocapsules of nanoparticles and/or polymers, based on the stabilization of a liquid-liquid interface in a ternary system. The thesis project aims, in a first part, to adapt the process to produce porous 3D gels by blocking the course of a phase transition. In this case, nanoparticles and polymers will stabilize the gel/pore interfaces. The applications targeted are in particular cellular growth supports but also supported catalysis.

In addition, we have recently demonstrated that this same process allows a compound to be nano-precipitated, which is thus encapsulated in large quantities, when nano-precipitation and capsule formation are performed simultaneously. Thus, a second objective of the thesis will be to generalize this process to develop a technology allowing to nanoformulate various active ingredients, for applications in nanomedicine, perfumery, food...

Although the subject has finalized objectives, it includes an important part of fundamental research in physico-chemistry: nano-precipitation/demexion processes, stabilization of liquid/liquid interfaces... The student will be trained in dynamic light diffusion, electron microscopy, fluorescence, etc. Specific measures for films and interfaces will also be implemented: surface tension, AFM, ellipsometry. The “Institut des Sciences Chimiques de Rennes”, the largest chemical laboratory in France, covers multiple research themes, ranging from the chemistry of materials to medicinal chemistry. It is fully equipped and thus provides a very favorable environment for the project to be carried out.

**Desired profile:** physico-chemist. Some knowledge of biochemistry and an interest in health and agri-food applications will be appreciated.

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Gross salary: 1 768.55 €/ months

Useful links:

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