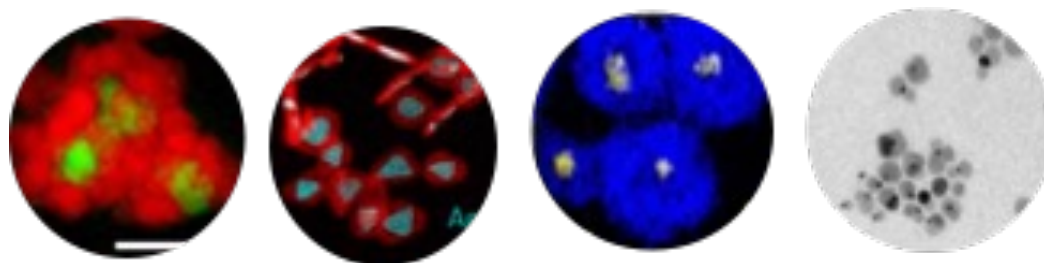


## Design and scale-up of multimodal inorganic magneto-plasmonic heterostructures using high-throughput microfluidics

Hybrid nanostructures, composed of materials of various shapes, sizes and compositions, are highly sought after functional materials. Among these nanohybrids, those formed by the association of magnetic materials such as magnetite, semiconductors (SC) and plasmonic metals (M) have received a lot of attention because of the synergies that could develop thanks to the interactions at the interfaces between the components. However, their synthesis and scaling remain a great challenge.[1] Here we propose to use high-temperature, high-throughput microfluidics: (i) to design and scale up hybrid multimodal heterostructures of different structures by associating metal or semiconductor plasmonic materials with magnetite in order to generate new magneto-plasmonic platforms (2) to understand thanks to the spatio-temporal resolution provided by the flow their formation; (3) to study the link between their structure at the nano-scale, properties and functions for heat generation under photo-stimulation.

The PhD candidate recruited will work on the design, characterization (structure, magnetic, optical, heat generation, etc.) and scale-up of new inorganic nanostructures in bulk and using flow chemistry. She or He will gain expertise in nanoparticle synthesis, characterization techniques, hyperthermia and flow chemistry.



[1] M. Hodges and R. E. Schaak , *Acc. Chem. Res.*, 2017, 50 , 1433 —1440

**Candidate profile:** We are looking for a very motivated candidate with a master degree in nanochemistry, physical chemistry or colloidal chemistry motivated by manipulation and experimentation. Skills in microfluidics are an asset but not mandatory. A good level of English, spoken and written is required.

**How to apply:** To apply please send a CV, a short motivation letter, a document stating your master and licence qualifications and one or two reference persons (master professor or master supervisor) that we can contact . The initial deadline of the application is May 10th 2023.

**Period:** October 2023 - September 2026. The PhD will take place in the PHENIX Laboratory; located on the campus Pierre & Marie Curie of Sorbonne Université.

**Contact :** [ali.abou\\_hassan@Sorbonne-universite.fr](mailto:ali.abou_hassan@Sorbonne-universite.fr)

*Sorbonne University is a world-class, research-intensive university bringing together a broad range of arts, humanities, social sciences, natural sciences, engineering and medicine. The scientific Pierre and Marie Curie campus was completely refurbished in 2016.*

*PHENIX is a laboratory at the interface between Chemistry, Physics and Materials Science with a long-standing expertise of colloidal systems, electrolytes and fluids under confinement. Its strength lies in a combination of experimental and modelling activities (numerical simulations). Several international projects and networks are in place in PHENIX, providing a rich and multinational environment.*

