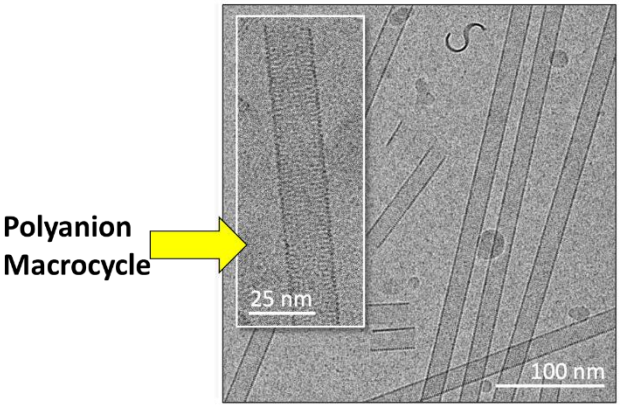
Postdoctoral Research Position (M/F) in Nanotubular Self-Assembly Driven by Host–Guest Recognition

A one-year postdoctoral position (expected start date: January 2027) is available jointly at the Institut Lavoisier de Versailles (UMR 8180) and the Laboratoire de Physique des Solides (UMR 8502) within the framework of a project funded by the PSINano Paris-Saclay program.

Context: The aim of this interdisciplinary project, situated at the crossroads of supramolecular chemistry, nanoscience, and liquid crystal science, is to design nano-systems inspired by biological microtubules that are capable of dynamic and controlled assembly and disassembly. While most artificial nanotubes lack complexity and adaptability, largely because they are constructed from a single type of building block, the project seeks to overcome this limitation by exploiting tunable host-guest interactions.

In this context, our consortium has recently demonstrated that a naturally occurring chiral macrocyclic sugar can act as a supramolecular "glue" for inorganic polyanionic species in aqueous solution, spontaneously generating supramolecular nanotubes (see Figure). Remarkably, these nanotubes are able to align and self-organize into liquid-crystalline phases, opening new opportunities for the development of adaptive and hierarchically structured materials.



View of the supramolecular nanotubes

Building on these findings, the project pursues three main objectives: (i) establishing the relationships between the elementary building blocks and the resulting nanotubes or intermediate superstructures, (ii) controlling assembly and disassembly through external stimuli, and (iii) investigating the collective organization of nanotubes, particularly in liquid-crystalline phases.

Objective of the post-doc: The successful candidate will contribute to all three objectives of the project. However, depending on their background, skills, and research interests, the relative time devoted to each objective may be adjusted. The postdoctoral researcher should have a strong interest in the physical chemistry of self-assembling systems, soft matter, and/or host-guest chemistry. The main techniques that will be employed to address the project objectives include multinuclear NMR spectroscopy, X-ray scattering, cryogenic transmission electron microscopy (cryo-TEM), and polarized optical microscopy. Experience with one or more of these techniques will be considered a strong asset. In addition, excellent communication and teamwork skills are expected, as the postdoctoral researcher will work closely with three principal investigators from two different laboratories.

Application process:

Interested candidates can contact Clément Falaise (clement.falaise@uvsq.fr), Pascale Launois (pascale.launois@cnrs.fr), and Amélie Leforestier (amelie.leforestier@universite-paris-saclay.fr), providing a CV and a cover letter.