

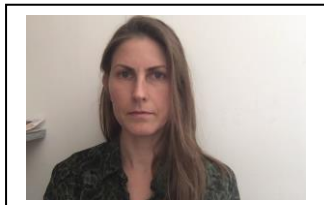
Chemical analyses at nanometer scale: when AFM teams with IR spectroscopy.

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Abstract

In the last decade, the AFM-IR technique, invented by Pr Alexandre Dazzi -former head of our team- in 2007, has become step by step a reference technique for infrared analysis at the nanometric scale. This technique combines the high spatial resolution of an AFM (Atomic Force Microscope) with the vibrational analysis capabilities of infrared spectroscopy. The field of applications is extremely vast and covers fields as diverse as molecular biology, polymer science, microbiology, medicine, geology, ancient materials and astrochemistry. Currently, the AFM-IR measurements is implemented with 3 different AFM modes (contact, tapping, peakforce tapping) and allow the analysis of many types of samples in terms of hardness and geometry. During the seminar, a short presentation of the technique will be done as well as the experimental constraints. Results obtained on protein assemblies will be presented to illustrate the capabilities of the AFM-IR technique. Furthermore, its relevance to investigate the degree of polydispersity of some secondary structures will be illustrated through the study of prion assemblies.

Short Bio/CV



I was hired as associate professor in 2009 at the physics department of Paris-Sud, doing my research works in the group of Alexandre Dazzi at the “Laboratoire de Chimie-Physique” (UMR 8000, Orsay, France). The group was pioneer in IR nanospectroscopy field as the leader of the group Alexandre Dazzi has developed and patented the so called AFM-IR technique. I was in charge of the biological applications. With the commercialization of the technique and the evolution of the application fields (from polymer science to biomedical/biophysics), the team has decided to open an analytical platform dedicated to analysis of complex matter from micro to nanoscale and taken on a research engineer. Since 2020, I’m the head of this team composed of Alexandre Dazzi (professor), Dominique Bazin (CNRS researcher DR), Jérémie Mathurin (research engineer) and 3 PhD students.