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High resolution imaging of the chemical reactivity of surfaces by opto-electrochemical microscopies

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Nanoparticles are used as nanocarriers of a chemical tag in fields as diverse as catalysis or nanomedicine (for diagnosis or drug-delivery). If the chemical activity carried by the nanoparticles (on their shell or in their core) is pre-determined by their synthesis, it can vary dramatically depending upon their shape, size, surface facets and their chemical environment. To improve the operational efficiency of nanocarriers it is then necessary to measure the local chemical activity of surfaces under operation with high resolution. Recently, promising strategies have been afforded by combining high-resolution microscopies and electrochemical actuation for the imaging of the chemical reactivity of surfaces. This contribution will illustrate such strategies in examples showing (i) how to develop low-cost imaging of (bio) chemical derivatization of surfaces and (ii) the quantification of electrochemical transformation of individual nanoobjects.

Biography

Frederic Kanoufi obtained an engineering diploma from ESPCI Paris in 1994 and a PhD from the University of Paris Diderot in 1998. After spending one year as a postdoctoral fellow in A.J. Bard's group at UT at Austin he was appointed by CNRS at ESPCI ParisTech. He is now CNRS Research Director at ITODYS laboratory at Université Paris Diderot. His research focuses on the development of electrochemical microscopies strategies (SECM and coupled electrochemistry and optical microscopies) for the inspection and tuning of chemical reactivities of surfaces. He is recipient of the 2006 Bronze medal of CNRS and has authored more than 80 papers, 2 book chapters and 3 patents.

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