

Comparative Pt L₃-edge XAS study of Pt nanoparticles with different morphologies in solution and tumor cells

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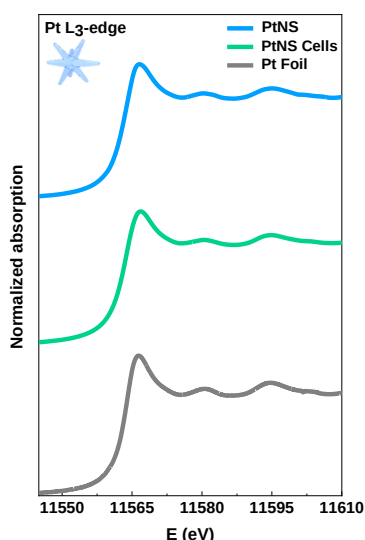
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ABSTRACT

Platinum (Pt) nanoparticles are promising therapeutic nanomaterials whose physicochemical properties, catalytic performance, photothermal efficiency, and structural stability are strongly influenced by their morphology [1,2]. Moreover, once internalized by cells, Pt nanostructures may undergo transformations that affect their therapeutic action. In this work, Pt L₃-edge X-ray absorption spectroscopy (XAS) was used to compare Pt-based nanoparticles with different morphologies, including nanostars, polyhedral nanoparticles, and nanodendrites [3].

XANES and EXAFS analyses were performed on Pt nanoparticles in solution and after incubation with tumor cells, enabling direct comparison of their oxidation state and local structure before and after cellular uptake [4]. This approach provides insight into morphology-dependent structural changes and the intracellular stability of Pt nanostructures. Experiments were carried out at the BM23 beamline (ESRF, Grenoble, France). Additional studies on nanothermometric effects will be conducted at the SAMBA beamline (SOLEIL, France).



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