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Raman imaging of MoO_X nanoparticles – characterization, cell internalization and comparison with s-SNOM imaging

Raman spectroscopy imaging has emerged as a potent tool for localizing nanostructures in cells and identifying their subcellular environment [1]. In our recent work, we prepared photothermal MoO_X nanoparticles through multiple preparation routes (liquid-phase exfoliation [2], microwave-assisted synthesis [3]) and investigated their properties related to the typical oxygen-defect structure and their biocompatibility [2]. In this contribution, we explore Confocal Raman Microscopy (CRM) of MoO_X nanoparticles in fixed cell samples and compare it to s-SNOM image (scanning Scattering Near Optical Microscopy). We evaluate both methods side by side in terms of the information provided, measurement features, and their ability to resolve cell structures as well as internalized MoO_X nanoparticles. Both techniques enable single-cell imaging, nanoparticle localization in cell compartments and provide the ability of tracking physicochemical changes of nanoparticles after their internalization.

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References

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Figures

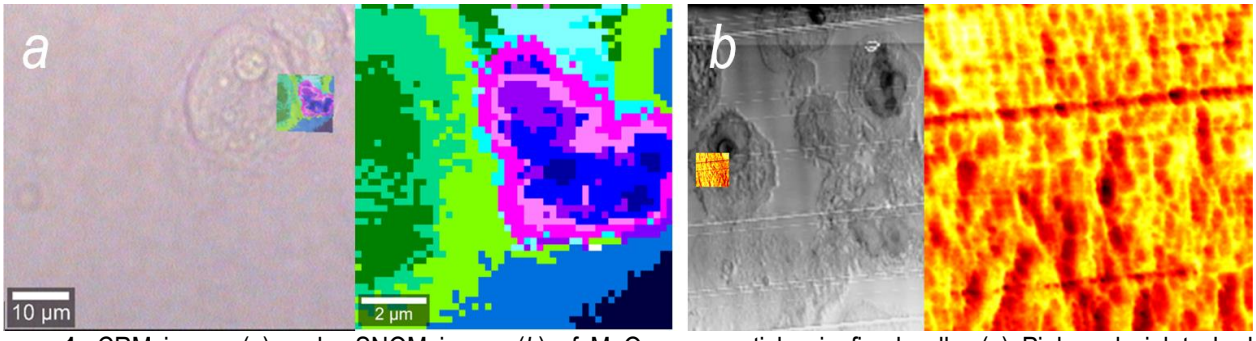

Figure 1: CRM image (*a*) and s-SNOM image (*b*) of MoO_X nanoparticles in fixed cells. (a) Pink and violet shades internalized MoO_X. (b) AFM mechanical scan is complemented by the MoO_X optical amplitude s-SNOM signal at 1050 rel. cm^{-1} (darker means higher intensity).