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Structural analysis of single nanoparticles in liquid by low-dose STEM nanodiffraction

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Highlights

- First use of STEM nanodiffraction for the structural analysis of single nano-objects in liquid.
- Advantages and drawbacks with respect to HRTEM analyses.
- An unprecedented possibility to reveal the structure of nanomaterials in liquid with very low electron dose.
- The rotation of gold nanocrystals in liquid is shape-dependant.

Abstract

Liquid-cell TEM has enabled an interdisciplinary community of scientists to carry out atomic- / nano-scale studies of solid/liquid interfaces. Nevertheless, the restricted resolution of TEM in liquid media and the necessity to reduce the electron dose to avoid harmful radiolytic effects induced by the beam have limited the use of high resolution imaging to study the atomic structure of nanomaterials in liquid. Here we show that STEM nanodiffraction can be exploited in liquid-cell TEM experiments to overcome these two limitations. We evidence that this technique allows

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