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***In situ* and *operando* 3D imaging of Pt and Pd electrocatalytic nanocrystals**

C. Atlan,^{1,2,3} C. Chatelier,^{1,2} A. Viola,³ M. Dupraz,^{1,2} S. Leake,² J. Eymery,¹
F. Maillard,³ M.-I. Richard^{1,2}

1. Univ. Grenoble Alpes, CEA Grenoble, IRIG, MEM, NRS, 17 rue des Martyrs
38000 Grenoble, France

2. ESRF - The European Synchrotron, 71 Avenue des Martyrs, Grenoble
38000, France

3. Univ. Grenoble Alpes, CNRS, Grenoble INP, Univ. Savoie Mont Blanc,
LEPMI, Grenoble, France

4. Laboratory for Inorganic Materials and Catalysis, Department of Chemical
Engineering and Chemistry, Eindhoven University of Technology, P. O. Box
513, 5600 MB Eindhoven, The Netherlands

Structural properties of transition metal are critical to understand the catalytic behavior of electrochemical processes. Here we show that 200 nm Pt and 500 nm Pd nanocrystals can be probed *in situ* and *operando* through Bragg Coherent X-ray Diffraction Imaging. This lens-less technique enables determining the morphology as well as mapping the strain and displacement fields of such nanoparticles. By measuring the Pt **002** Bragg reflection we show evidence of heterogeneous and potential-dependent strain distribution between highly-coordinated ($\{100\}$ and $\{111\}$ facets) and under-coordinated atoms (edges and corners) as well as evidence of strain propagation from the surface to the bulk of the nanoparticle. This allows to unveil adsorption sites. We also demonstrate that the formation of highly strained palladium hydride nanocrystals can be tracked under potential control. Even though the beta phase (hydrogen rich) Bragg peak comes and vanishes at relevant potentials, the nanocrystal does not recover its pristine morphology.