Supporting information

Accelerated stress-test of Pt/C nanoparticles in interface with an anion-exchange membrane – an identical-location transmission electron microscopy study

Clémence Lafforgue [1], Marian Chatenet [1-2,]*, Laetitia Dubau[1], Dario R. Dekel [3-4]

[1] Univ. Grenoble Alpes, CNRS, Grenoble INP[#], LEPMI, 38000 Grenoble, France

[2] Institut Universitaire de France (IUF), 1 rue Descartes, 75231 Paris Cedex 05, France

[3] The Wolfson Department of Chemical Engineering, Technion – Israel Institute of Technology, Haifa 3200003, Israel

[4] The Nancy & Stephan Grand Technion Energy Program (GTEP), Technion – Israel Institute of Technology, Haifa 3200003, Israel

[#] Institute of Engineering Univ. Grenoble Alpes

* Corresponding author: Marian.Chatenet@grenoble-inp.fr

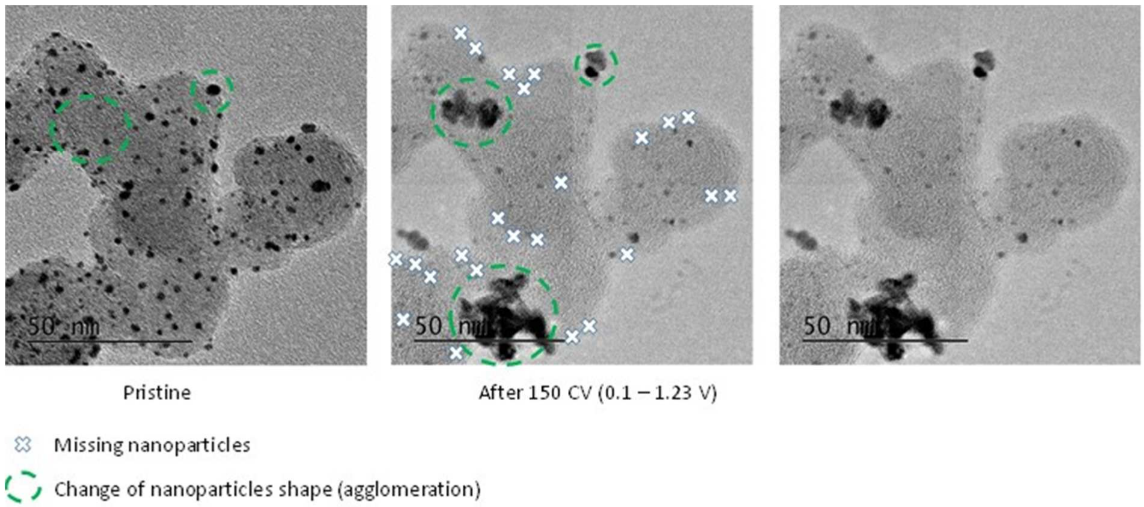

Figure S1: Representative ILTEM micrographs of Pt/C nanoparticles before (Pristine) and after 150 CV cycles performed at v = 100 mV s^{-1} between 0.1 and 1.23 V vs. RHE in 0.1 M NaOH at T = 25°C. The markers are not comprehensive and just illustrate the main degradation mechanisms at stake during the potential cycling procedure.

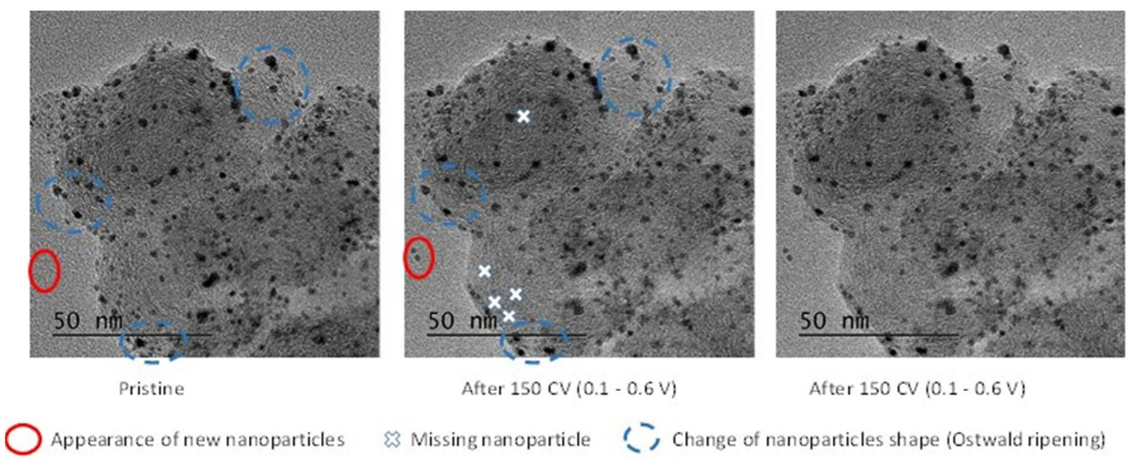

Figure S2: Representative ILTEM micrographs of Pt/C nanoparticles before (Pristine) and after 150 CV cycles performed at v = 100 mV s^{-1} between 0.1 and 0.6 V vs. RHE in 0.1 M NaOH at T = 25°C. The markers are not comprehensive and just illustrate the main degradation mechanisms at stake during the potential cycling procedure.

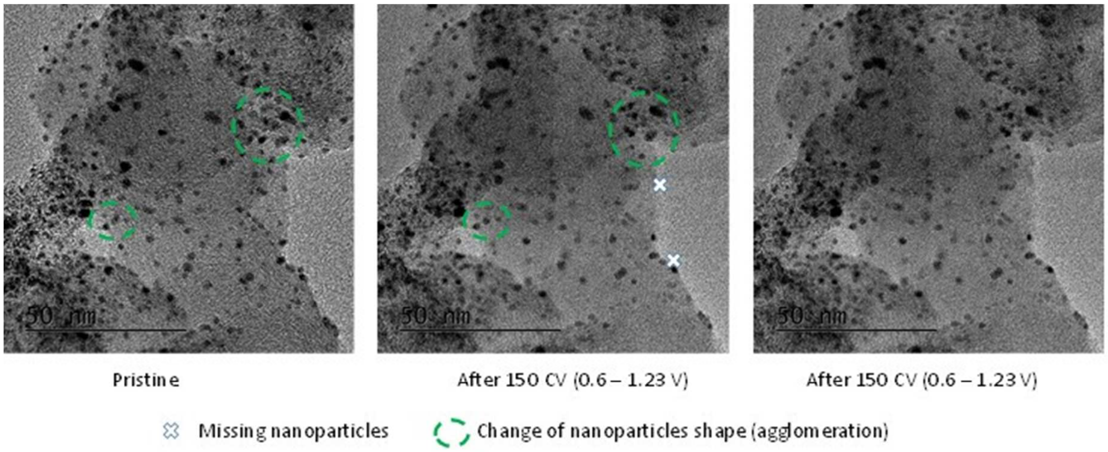

Figure S3: Representative ILTEM micrographs of Pt/C nanoparticles before (Pristine) and after 150 CV cycles performed at v = 100 mV s^{-1} between 0.6 and 1.23 V vs. RHE in 0.1 M NaOH at T = 25°C. The markers are not comprehensive and just illustrate the main degradation mechanisms at stake during the potential cycling procedure.

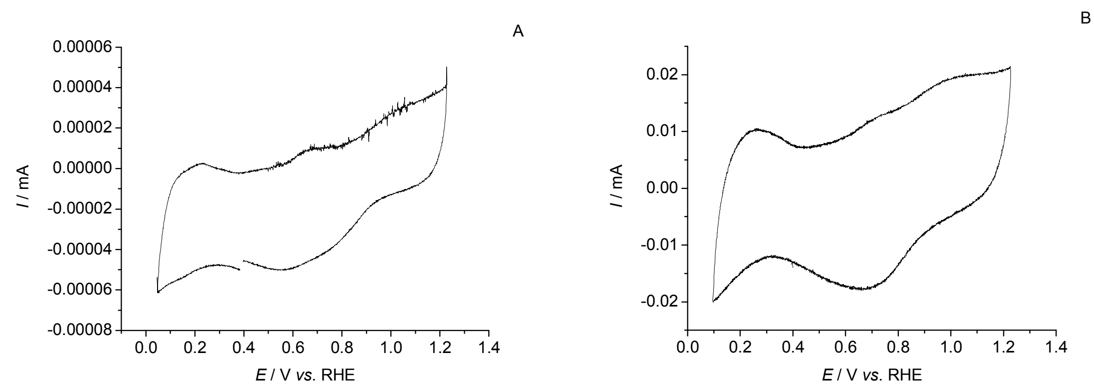

Figure S4: (A) typical electrochemical response of an ultra-microelectrode with cavity filled with 10 wt% Pt/C electrocatalyst in interface with an anion-exchange membrane. The measurement was performed in the dry cell under inert atmosphere at v = 20 mV s^{-1}. (B) Example of a representative cycle (here the 150^{th}) of the accelerated stress test performed on the gold TEM grid supporting the 10wt% Pt/C electrocatalyst for the ILTEM experiments. The measurement was performed in the dry cell under inert atmosphere at v = 100 mV s^{-1}.

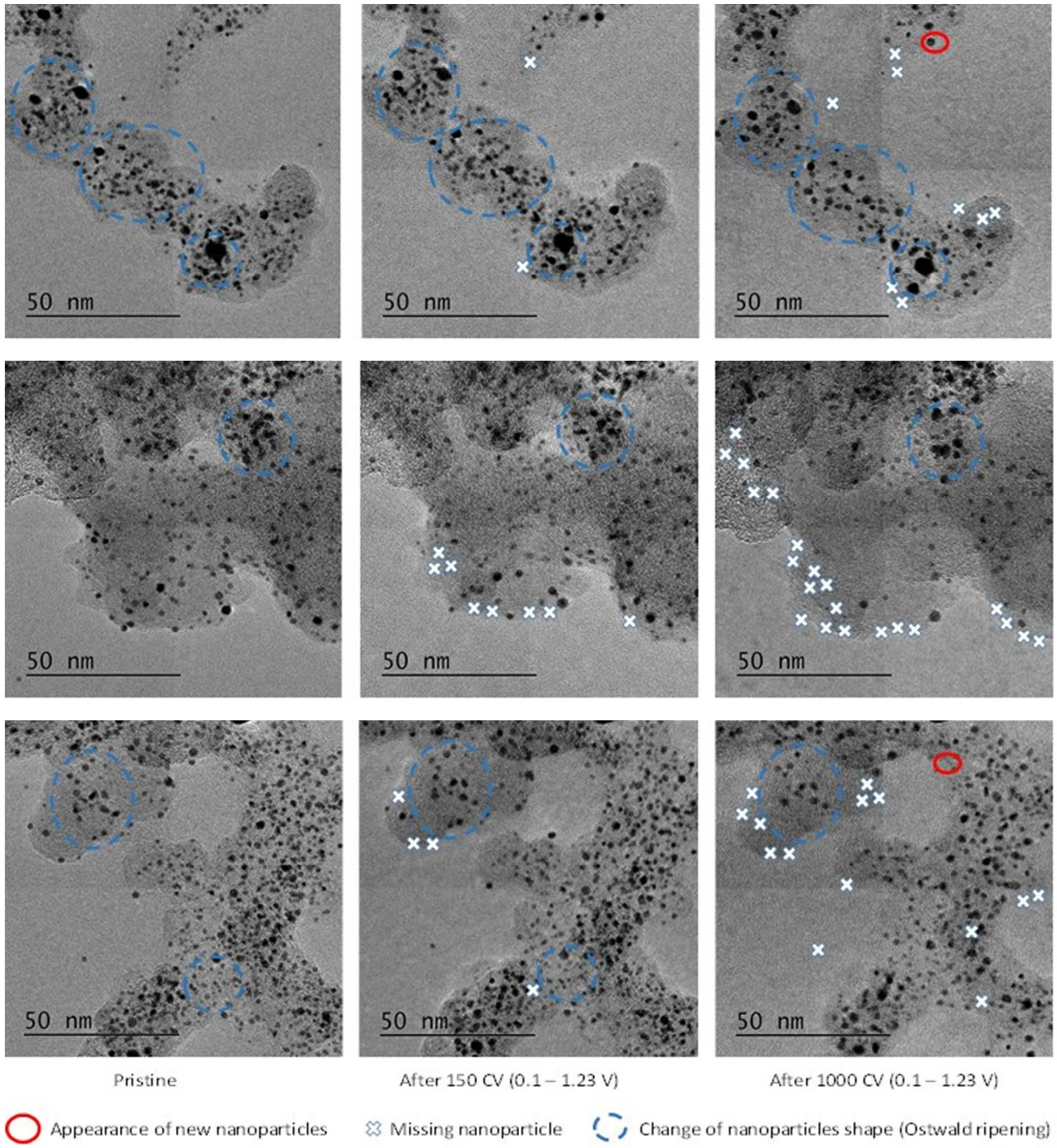

Figure S5: Representative ILTEM micrographs of Pt/C nanoparticles before (Pristine) and after 150 or 1000 CV cycles performed at v = 100 mV s^{-1} between 0.1 and 1.23 V vs. RHE in interface with an anion exchange membrane at T = 25°C. The markers are not comprehensive and just illustrate the main degradation mechanisms at stake during the potential cycling procedure.

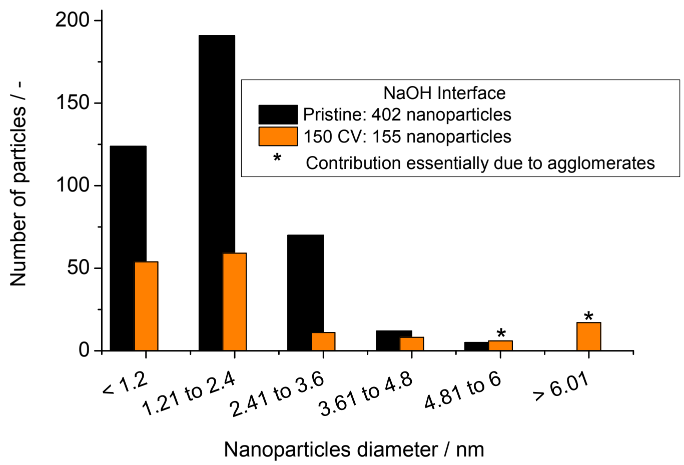

Figure S6: Particle size distribution histograms constructed by counting isolated and agglomerated nanoparticles from representative ILTEM micrographs of Pt/C before (Pristine) and after (A) 150 CV cycles performed in 0.1 M NaOH, the potential being varied at v = 100 mV s^{-1} between 0.1 and 1.23 V vs. RHE and the cell temperature being T = 25°C.