Supplementary Material (ESI) for *PCCP*

Electronic Supplementary Information

Durability of Pt/Graphitized Carbon Catalysts for the Oxygen Reduction Reaction Prepared by the Nanocapsule Method

Hiroshi Yano,[a] Tomohiro Akiyama,[b] Petra Bele,[c,d] Hiroyuki Uchida,[a,c] and Masahiro Watanabe*[,a]

[a]*Fuel Cell Nanomaterials Center,* [b]*Interdisciplinary Graduate School of Medicine and Engineering,* [c]*Clean Energy Research Center, University of Yamanashi, 4 Takeda, Kofu 400-8510, Japan*
E-mail: m-watanabe@yamanashi.ac.jp
[d]*Technische Universität München, Physik Department 1, James-Franck-Strasse 1, 85748 Garching, Germany*

STEM image analysis using LAT image processing

The advanced data evaluation of the STEM images is initiated from the raw data. First, standard image corrections are implemented, which applied background correction and contrast enhancement functions to the images. Due to problems occurring in the STEM images, arising for samples with small foreground objects together with local thickness changes of the support material itself, the previously developed modified threshold routine using the local adaptive threshold (LAT) routine[33], was applied to the images. For a detailed depiction of the complete advanced image analysis, please refer to Ref. 33.

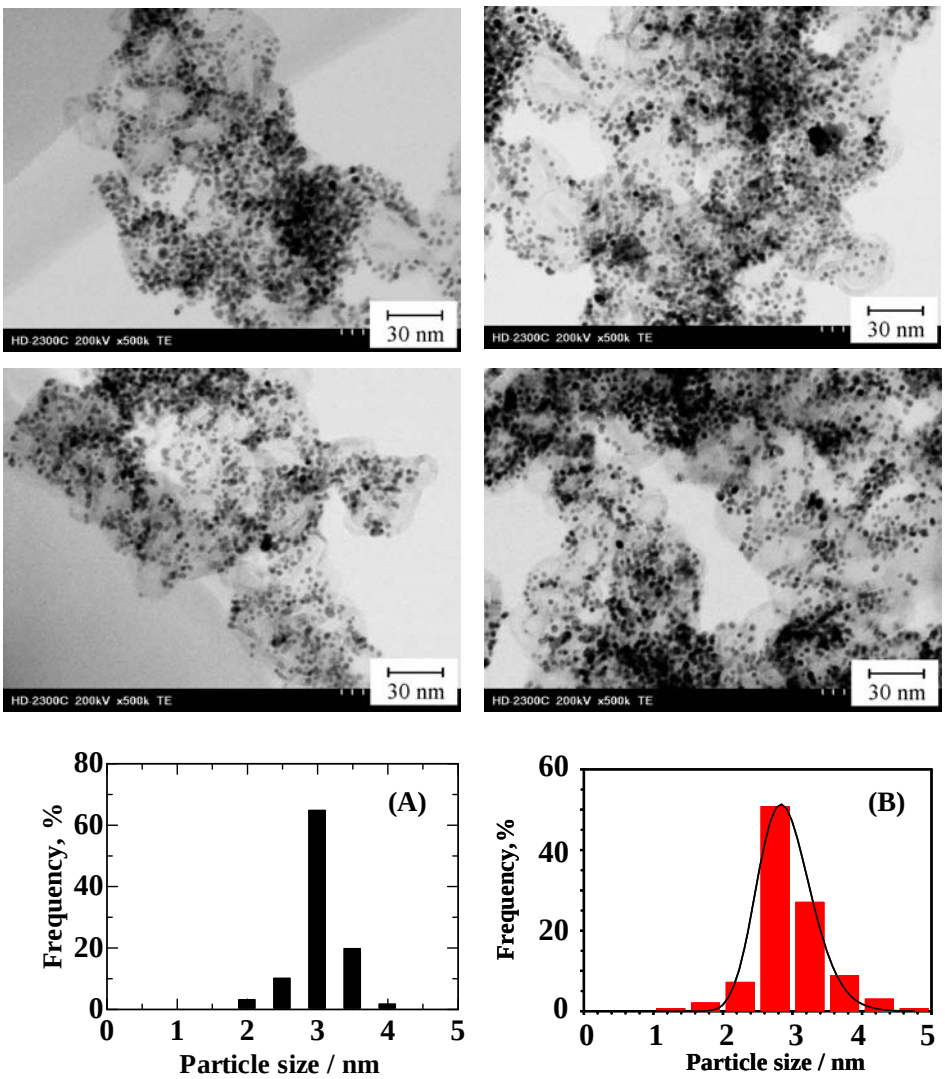

Figure S1. STEM images used for LAT image processing and particle size distribution histograms of the n-Pt/GC catalyst obtained by (A) direct visual examination (500 particles) and (B) via the LAT image processing technique (936 particles).

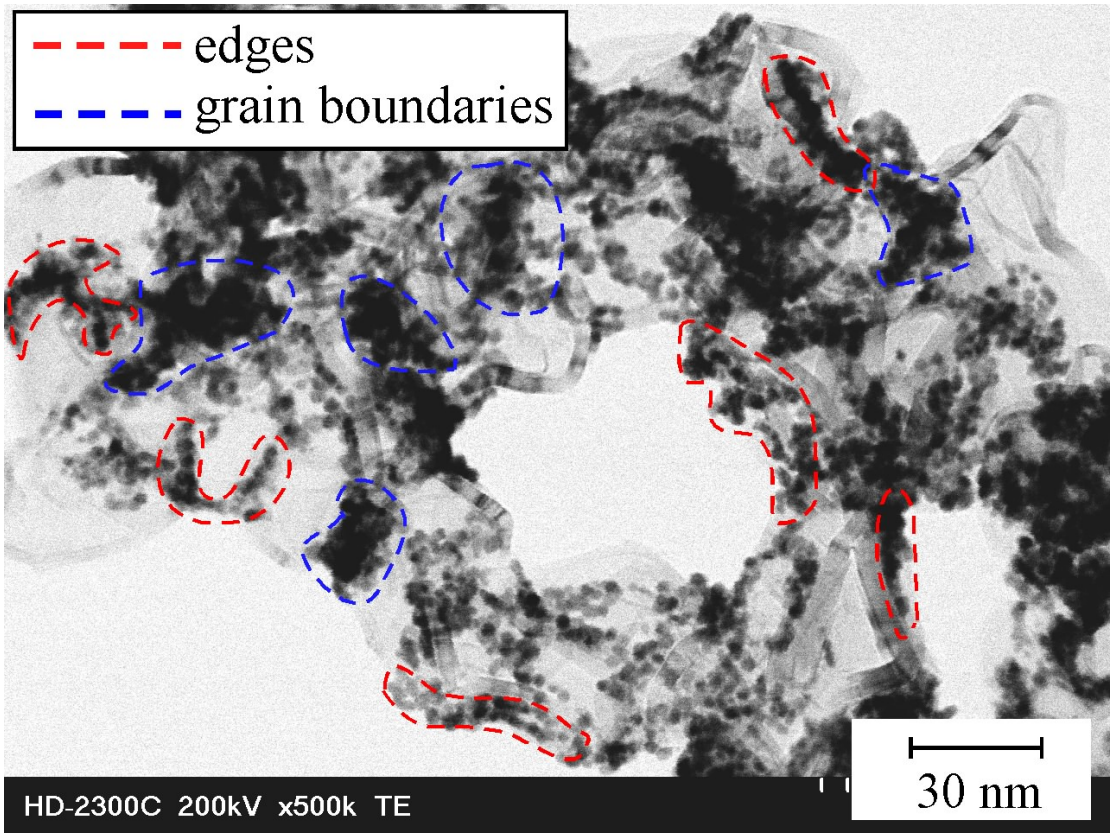

Figure S2. The places of the segregated Pt particles on the edges (-----) and grain boundaries (-----) of c-Pt/GC (commercial) catalyst.

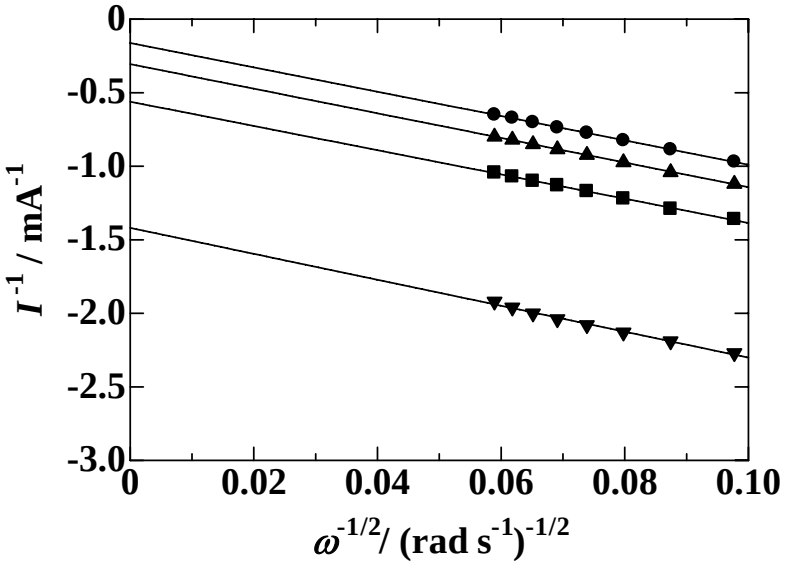

Figure S3. Levich-Koutecky plots obtained from hydrodynamic voltammograms for the ORR at (●) 0.70 V, (▲) 0.76 V, and (■) 0.80 V vs. RHE at a c-Pt/CB (commercial) electrode in O_2-saturated 0.1 M $HClO_4$ solution at 25 ^oC.

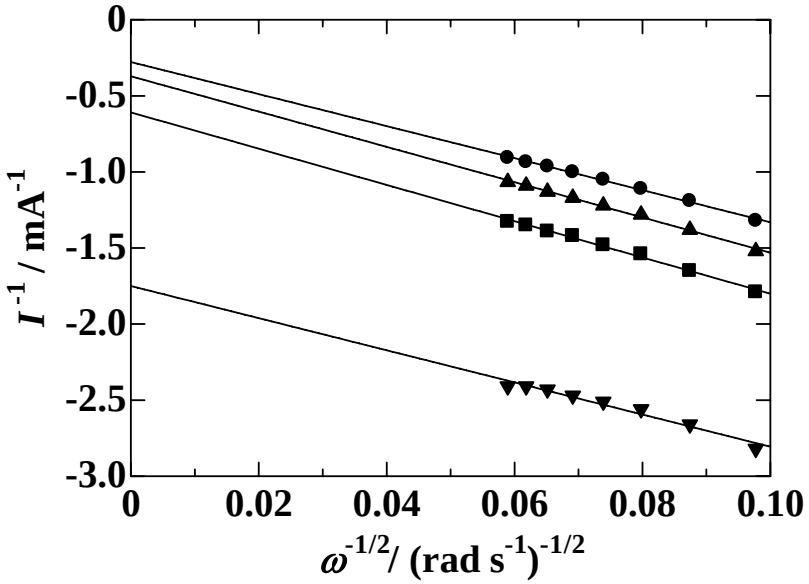

Figure S4. Levich-Koutecky plots obtained from hydrodynamic voltammograms for the ORR at (●) 0.70 V, (▲) 0.76 V, and (■) 0.80 V vs. RHE at a c-Pt/GC (commercial) electrode in O_2-saturated 0.1 M $HClO_4$ solution at 25 ^oC.

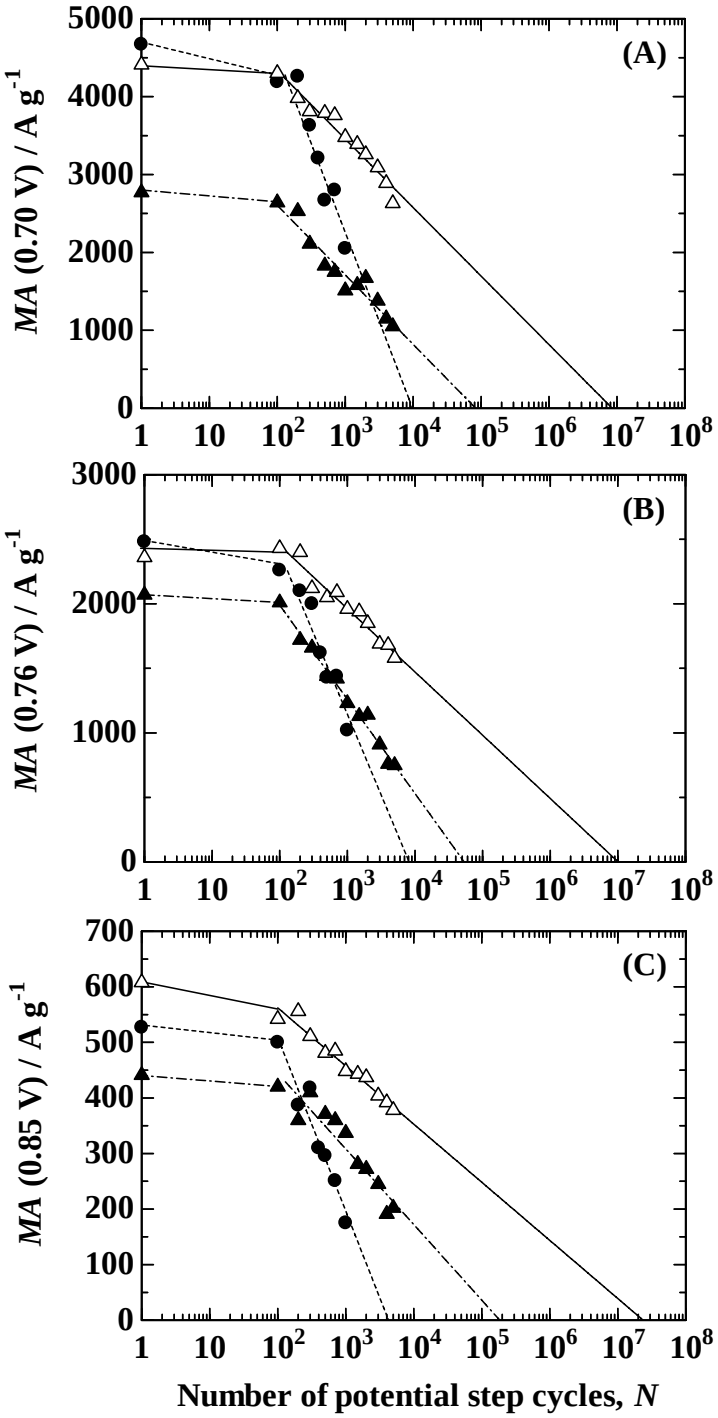

Figure S5. Plots of *MA* at Nafion-coated (Δ) n-Pt/GC, (▲) c-Pt/GC, and (●) c-Pt/CB electrodes at (A) 0.70, (B) 0.76 V, and (C) 0.85 V vs. RHE as a function of log [*N*].