

Highly-Durable Pt Nanoparticle-Supported Carbon Catalyst for the Oxygen Reduction Reaction Tailored by an Ionic Liquid Thin Layer

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Electronic Supplementary Information

Figure S1 - S5 p. 2

Captions for Movie S1 - S3 p. 7

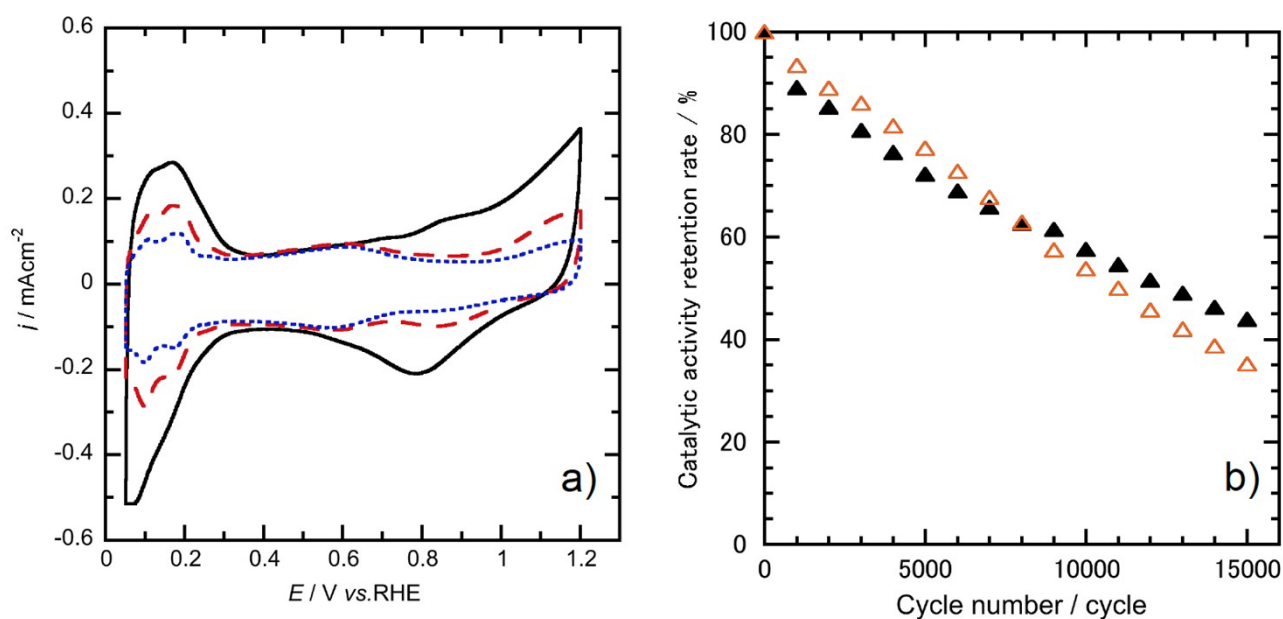


Fig. S1 a) Cyclic voltammograms recorded at a TEC10V30E-IL after (—) 0, (---) 7000, and (.....) 15000 cycle potential tests. b) Variation in the catalytic activity retention rate for the ECSA estimated at the (▲) TEC10V30E and (△) TEC10V30E-IL as a function of cycle number. The electrolyte was a N_2 -saturated 0.1 M HClO_4 aqueous solution at room temperature, and the scan rate was 10 mV s^{-1} .

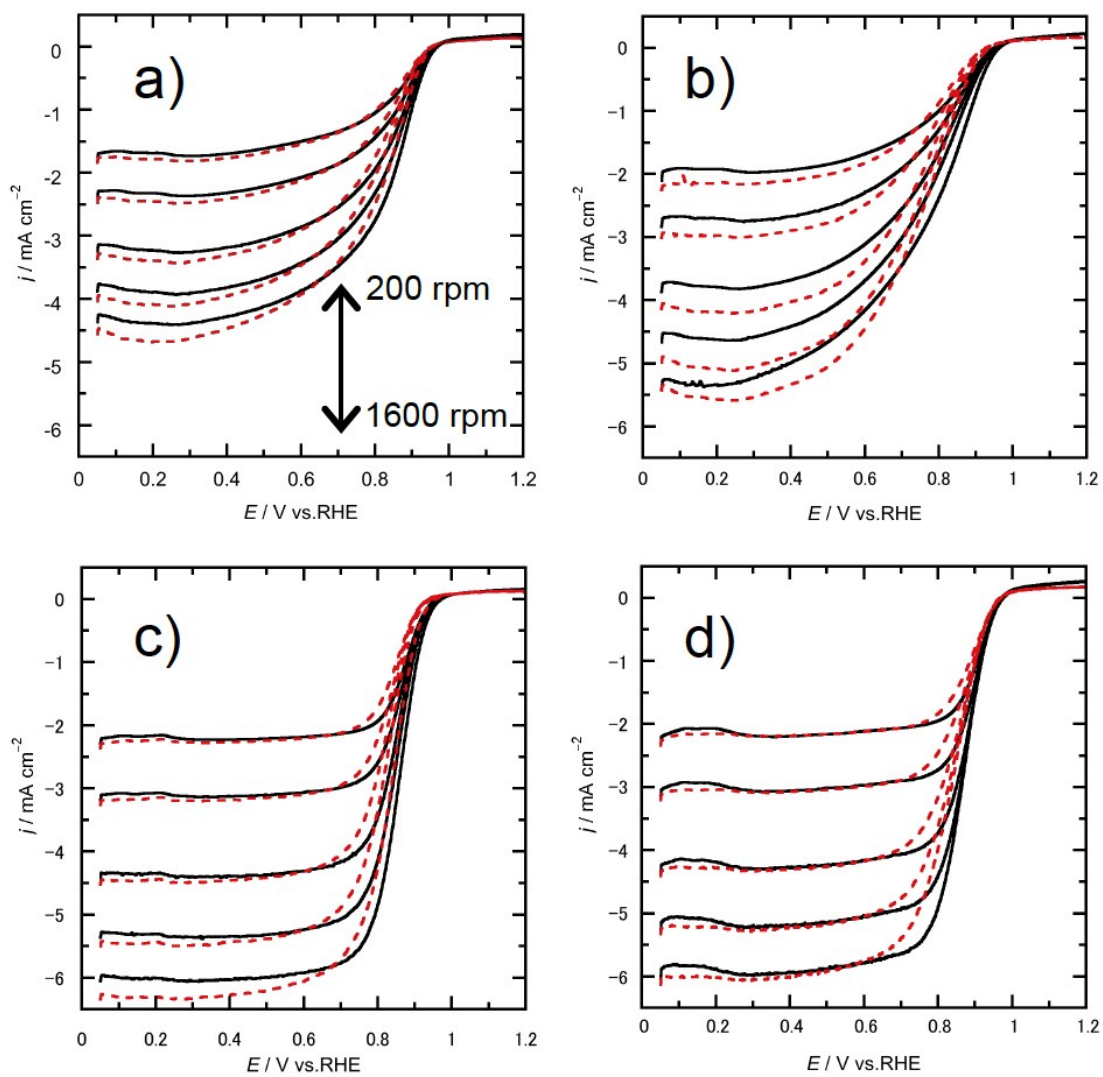


Fig. S2 Hydrodynamic voltammograms recorded at: a) Pt-SWCNTs, b) Pt-SWCNTs_{conv}, c) Pt-Vulcan[®], and d) TEC10V30E catalysts (—) before and (---) after 15000 cycle tests. The voltammetric experiments were conducted in O₂-saturated 0.1 M HClO₄ aqueous solution at room temperature. The scan rate of 10 mV s⁻¹. The rotation speeds for the electrodes were, 200, 400, 800, 1200, and 1600 rpm.

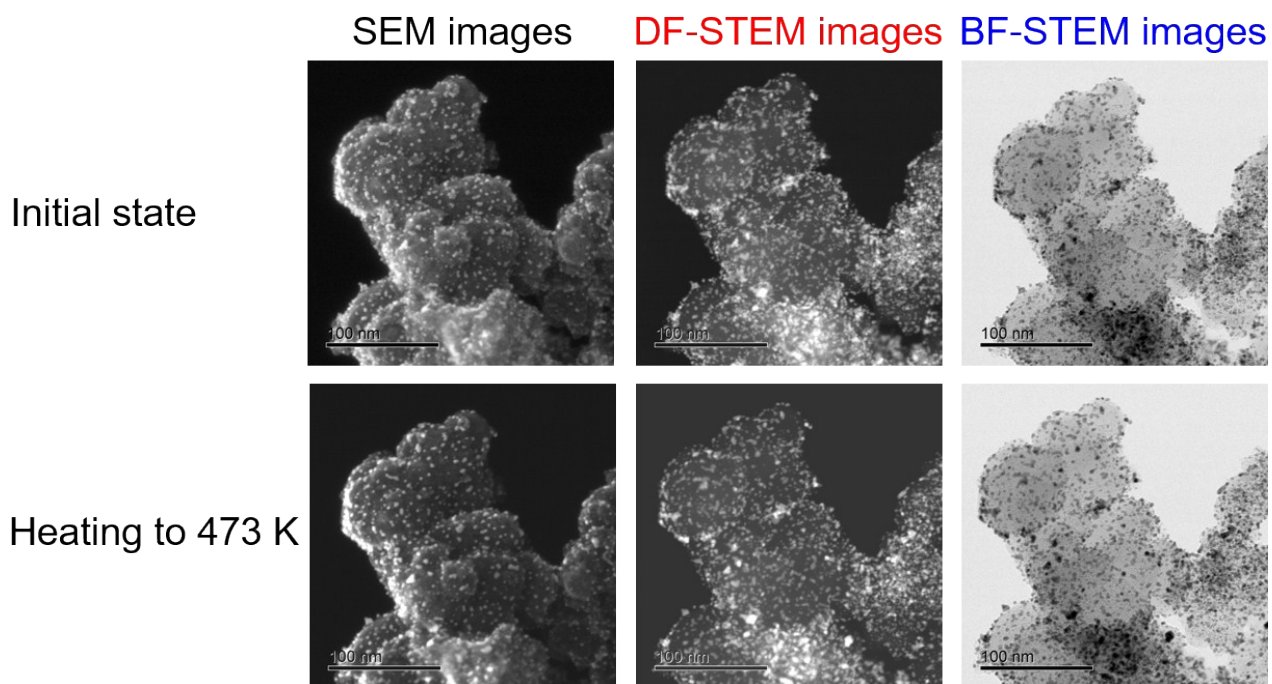


Fig. S3 SEM, annular dark-field STEM (DF-STEM), and bright-field STEM (BF-STEM) images of TEC10V30E before and after heating to 473 K under vacuum conditions (5.75×10^{-5} Pa). The accelerated voltage was 300 kV.

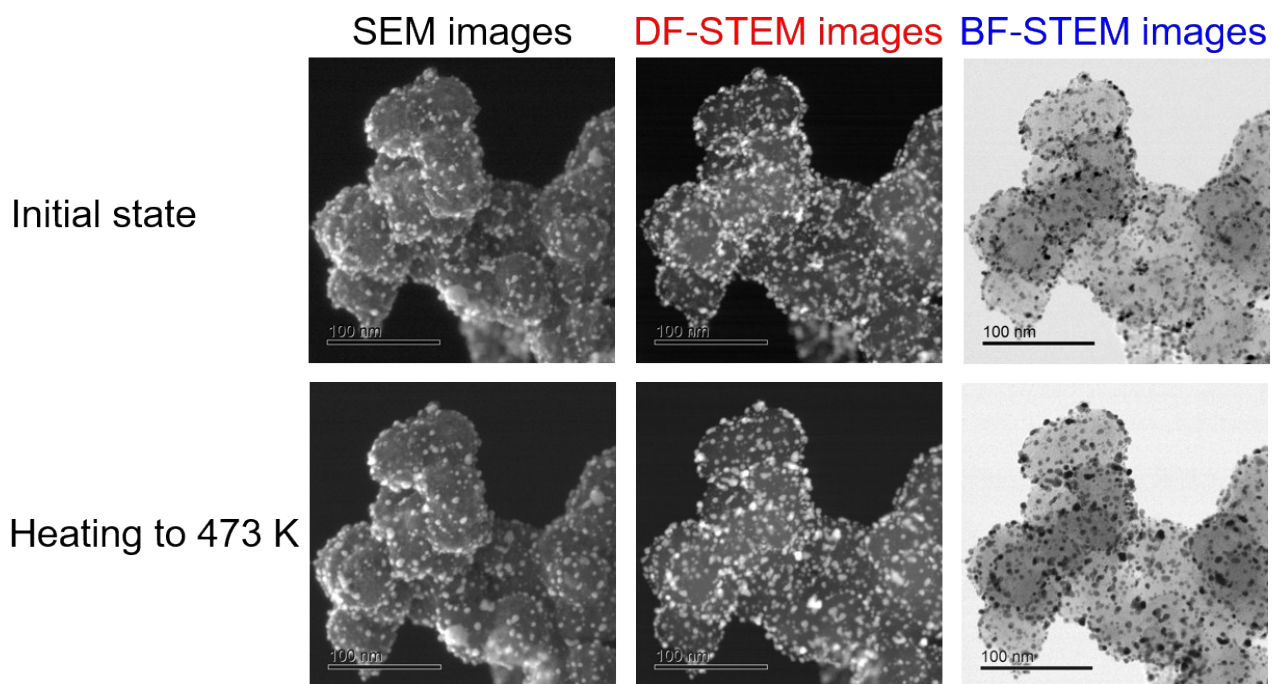


Fig. S4 SEM, annular dark-field STEM (DF-STEM), and bright-field STEM (BF-STEM) images of Pt-Vulcan[®] before and after heating to 473 K under vacuum conditions (5.75×10^{-5} Pa). The accelerated voltage was 300 kV.

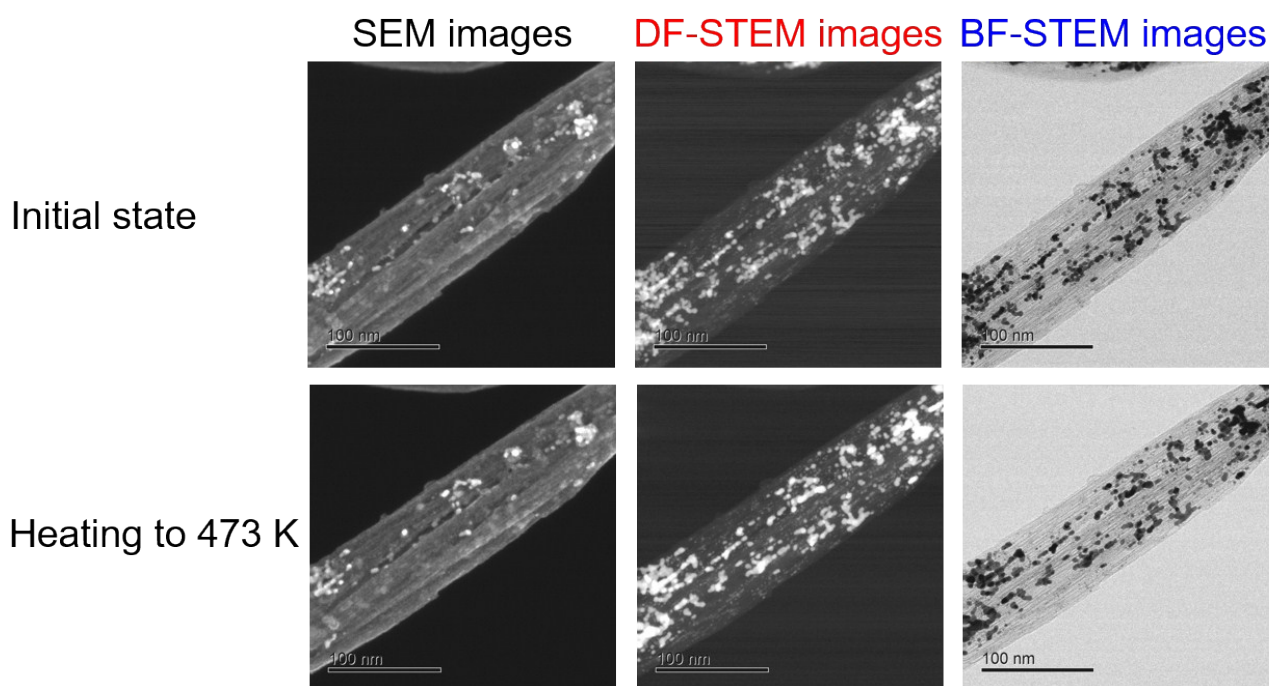


Fig. S5 SEM, annular dark-field STEM (DF-STEM), and bright-field STEM (BF-STEM) images of Pt-SWCNTs before and after heating to 473 K under vacuum conditions (5.75×10^{-5} Pa). The accelerated voltage was 300 kV.

Captions for Movie S1 - S3

Movie S1 (Left) SEM and (Right) annular dark-field STEM (DF-STEM) images of TEC10V30E before and after heating to 473 K under vacuum conditions (5.75×10^{-5} Pa). The accelerated voltage was 300 kV.

Movie S2 (Left) SEM and (Right) annular dark-field STEM (DF-STEM) images of Pt-Vulcan[®] before and after heating to 473 K under vacuum conditions (5.75×10^{-5} Pa). The accelerated voltage was 300 kV.

Movie S3 (Left) SEM and (Right) annular dark-field STEM (DF-STEM) images of Pt-SWCNTs before and after heating to 473 K under vacuum conditions (5.75×10^{-5} Pa). The accelerated voltage was 300 kV.