

Electronic Supplementary Information

Temperature Dependence of Oxygen Reduction Activity at Nafion-Coated Pt/Graphitized Carbon Black Catalysts Prepared by the Nanocapsule Method

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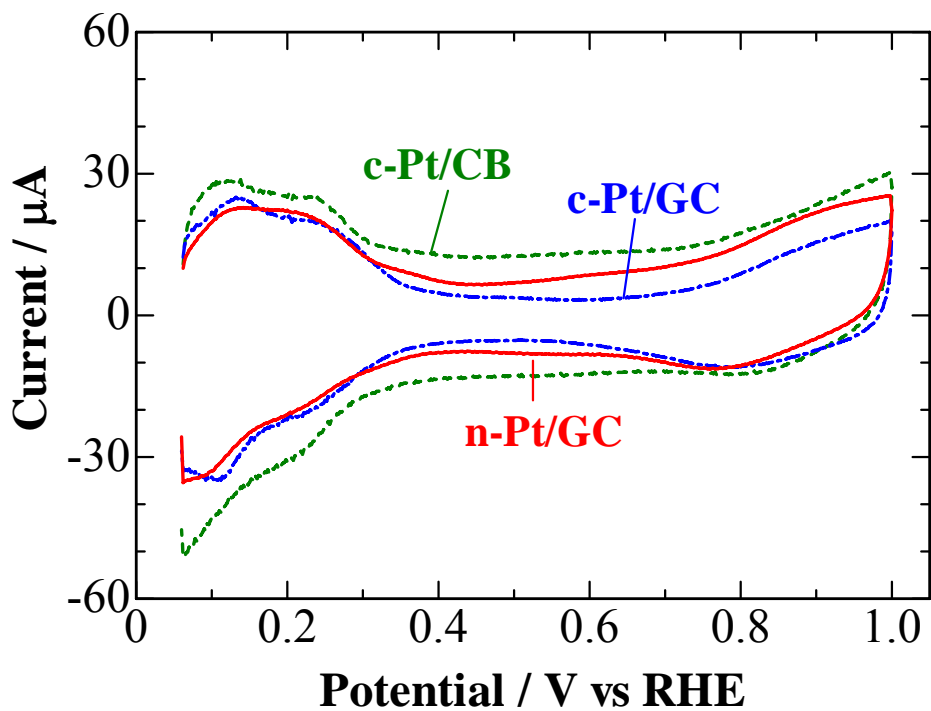


Fig. S1 Cyclic voltammograms on Nafion-coated n-Pt/GC, c-Pt/GC and c-Pt/CB electrodes in 0.1M HClO₄ solution purged with N₂ at 30°C. Potential sweep rate = 0.1 V/s. The values of electrochemical active surface area (*S*) evaluated from the electrical charge for the hydrogen desorption wave Q_H were 0.16 cm² (n-Pt/GC), 0.25 cm² (c-Pt/GC), and 0.21 cm² (c-Pt/CB).

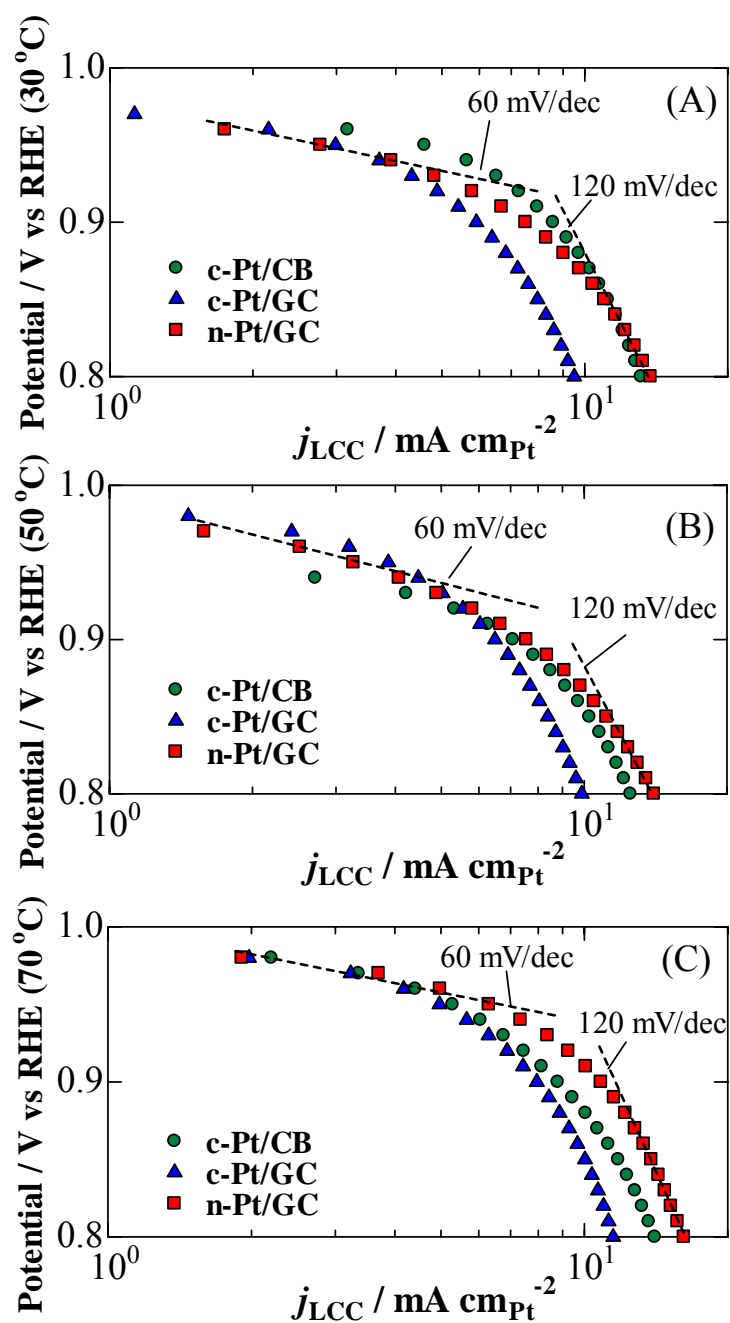


Fig. S2 Tafel plots [E vs $\log j_{LCC}$] for the ORR at Nafion-coated n-Pt/GC, c-Pt/GC and c-Pt/CB electrodes at (A) 30 °C, (B) 50 °C, and (C) 70 °C obtained from hydrodynamic voltammograms for ORR in O_2 saturated 0.1 M HClO_4 solution. j_{LCC} is $I_L \times I / S(I - I_L)$, where I_L is the limiting current, I is the current given at each potential, and S is the electrochemical active surface area. Mean flow rate of electrolyte solution $U_m = 15 \text{ cm s}^{-1}$.

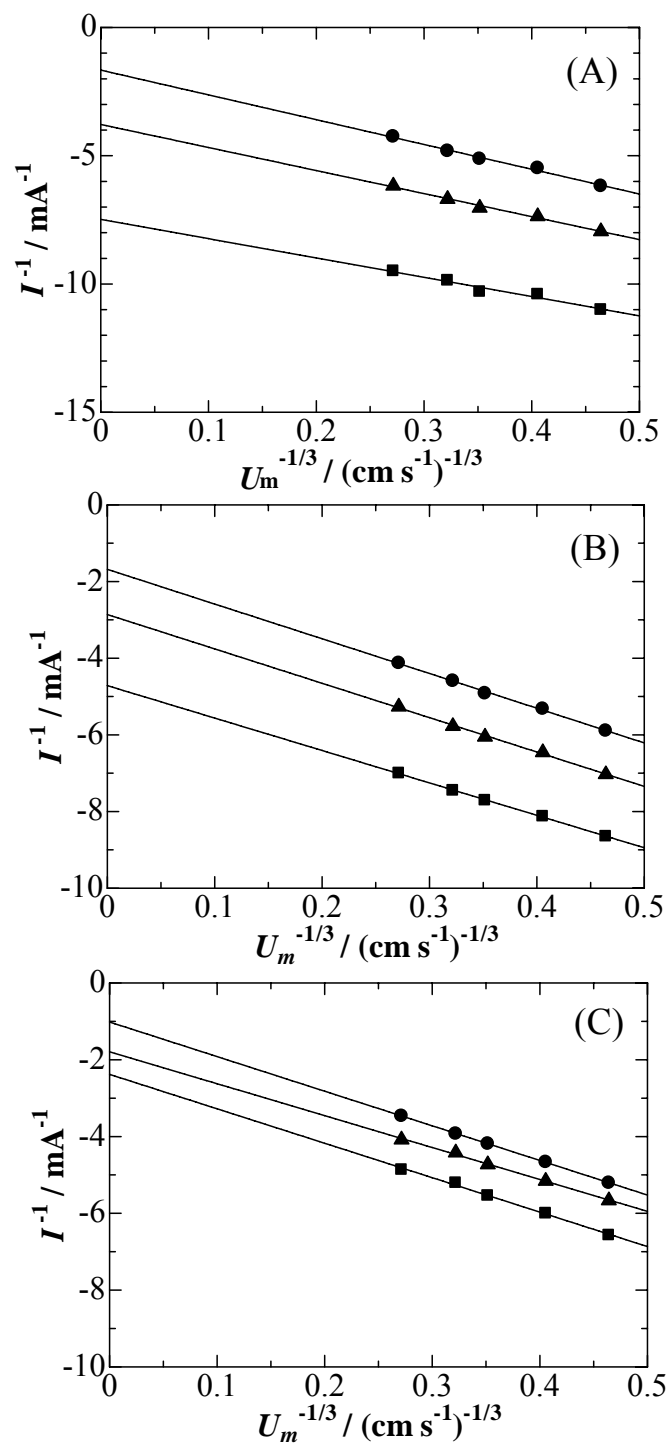


Fig. S3 I^{-1} vs $U_m^{-1/3}$ plots obtained from hydrodynamic voltammograms for the ORR at (■) 0.80, (▲) 0.76, and (●) 0.70 V vs RHE on (A) n-Pt/GC, (B) c-Pt/GC, and (C) c-Pt/CB electrodes in O_2 -saturated 0.1 M $HClO_4$ solution at 30 °C.

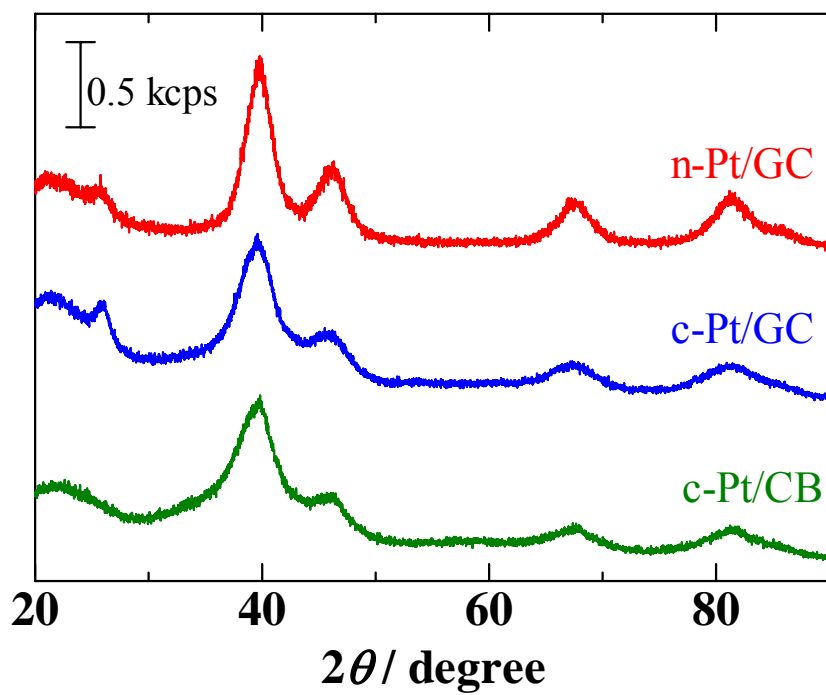


Fig. S4 X-ray diffraction patterns of pristine powders of n-PtGC, c-Pt/GC, and c-Pt/CB catalyst.

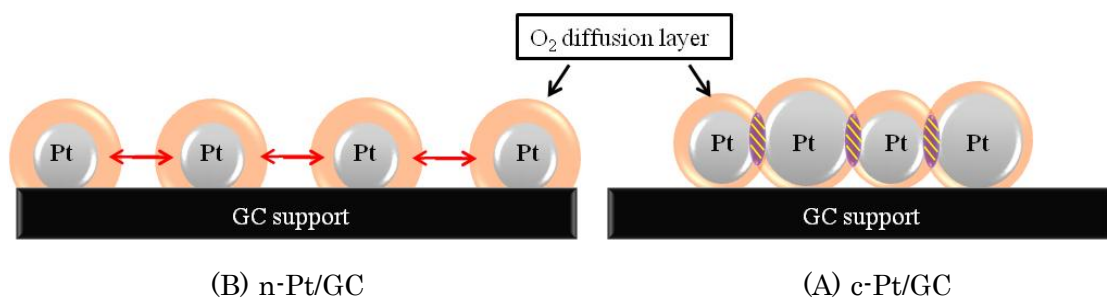


Fig. S5 Illustration of “territories” (radial diffusion fields) of (A) n-Pt/GC and (B) c-Pt/GC catalyst particle relating to the reactant O₂.