Supporting Information

Preparation and Characterization of PtIr Alloy Dendritic Nanostructures for Superior Electrochemical Activity and Stability in Oxygen Reduction and Ethanol Oxidation Reactions

Young-Woo Lee,[†,‡,§] Eui-Tak Hwang,[†,§] Da-Hee Kwak,[†] and Kyung-Won Park[*,†]*

† Department of Chemical Engineering, Soongsil University, Seoul 156-743, Republic of Korea.

‡ Department of Engineering Science, University of Oxford, Oxford OX1 3PJ, United Kingdom.

§ These authors contributed equally to this work.

* Corresponding author. Tel: 82-2-820-0613. Fax: 82-2-812-5378.

E-mail address: kwpark@ssu.ac.kr (Prof. K.-W. Park).

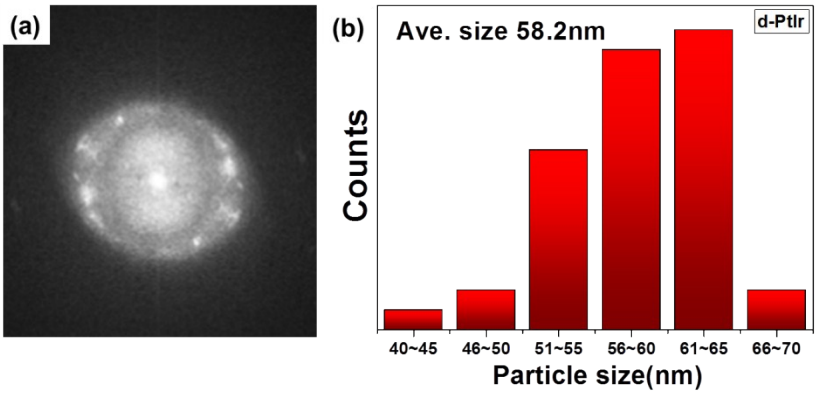

Figure S1. (a) Fast Fourier-transform (FFT) pattern corresponding to the HR-TEM image of Figure 1(b). The dendritic Pt-Ir alloy nanostructures consist of polycrystalline structures. (b) Particle size distribution of the dendritic Pt-Ir alloy nanostructures.

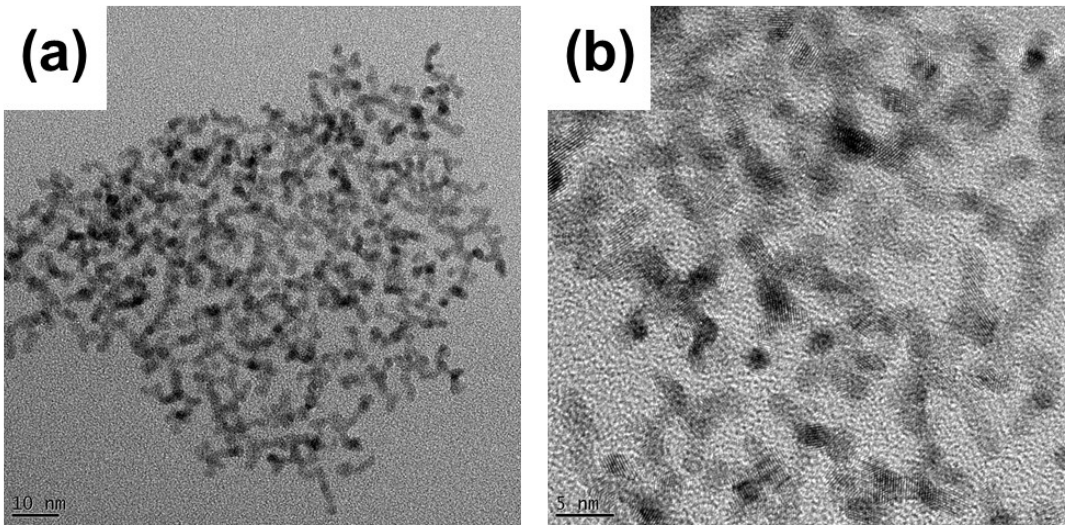

Figure S2. Field-emission transmission electron microscopy (FE-TEM) images of the Pt-Ir nanostructures prepared in the absence of a CTAC.

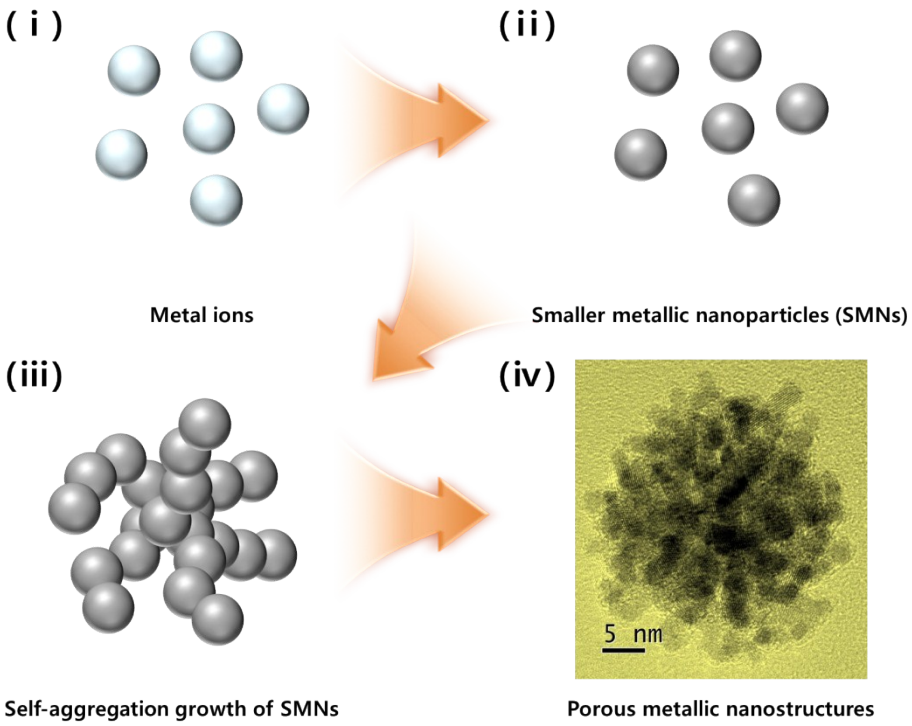

Figure S3. Schematic illustration of the synthesis of the porous Pt-Ir alloy nanostructures in the presence of a CTAC.

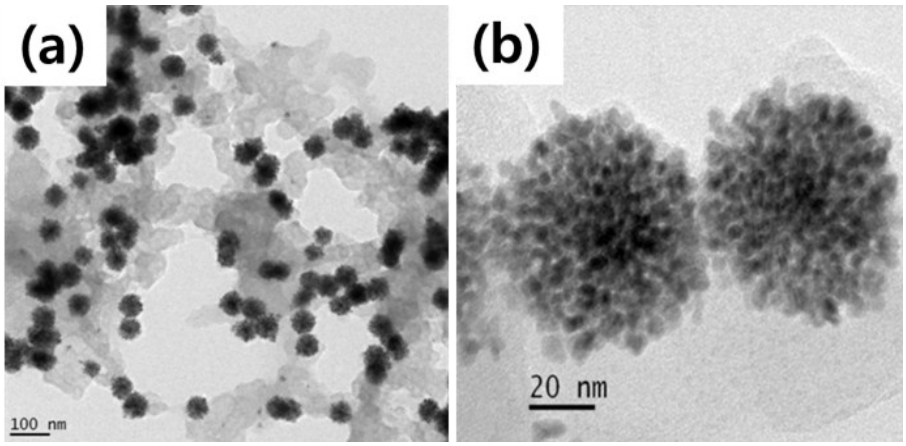

Figure S4. (a and b) FE-TEM images of the d-PtIr NPs deposited on carbon black.

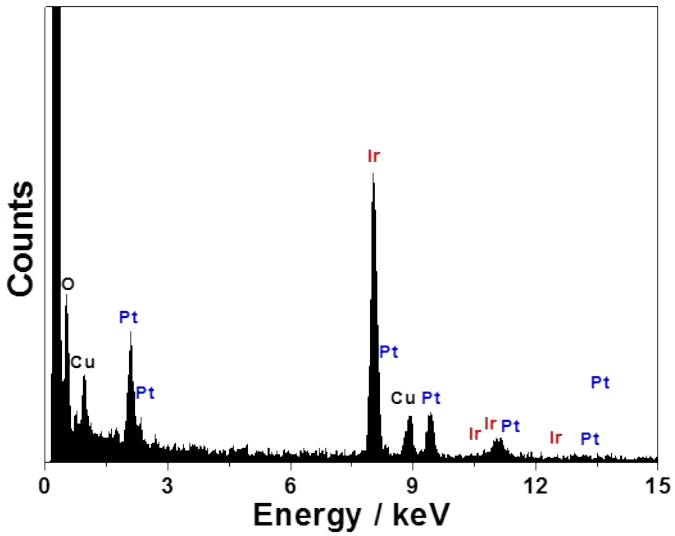

Figure S5. EDX spectrum of s-PtIr NPs.

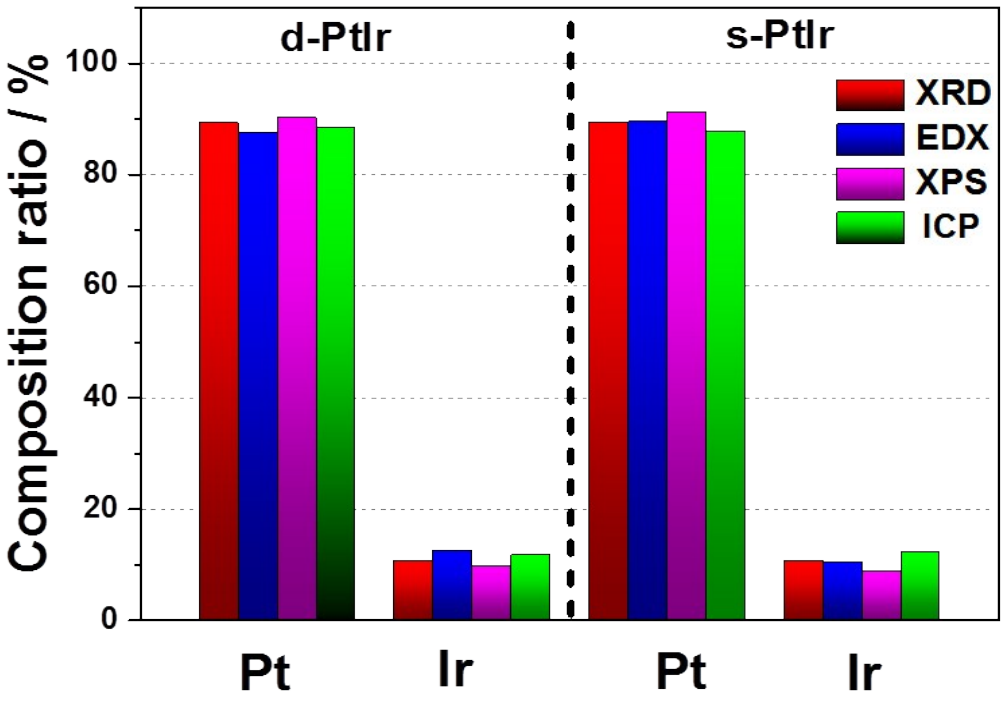

Figure S6. Comparison of the elemental compositions of Pt and Ir in d-PtIr and s-PtIr nanostructures measured using XRD, EDX, XPS, and ICP-MS.

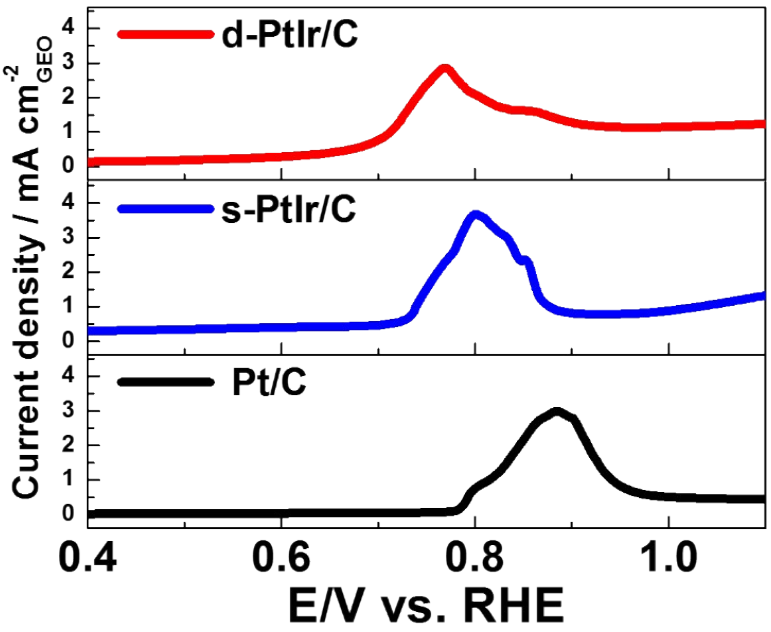

Figure S7. CO-stripping voltammograms of the d-PtIr/C, s-PtIr/C, and Pt/C electrocatalysts in 0.1 M $HClO_4$.

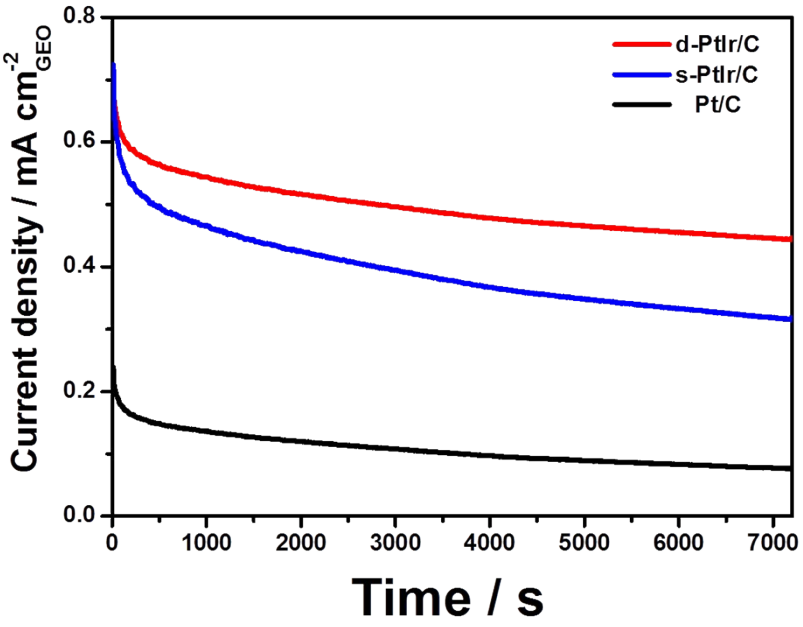

Figure S8. Chronoamperometric curves of the d-PtIr/C, s-PtIr/C, and Pt/C electrocatalysts at 0.5 V (vs. Ag/AgCl) for 7200 s in 0.1 M $HClO_4$ + 0.2 M C_2H_5OH.

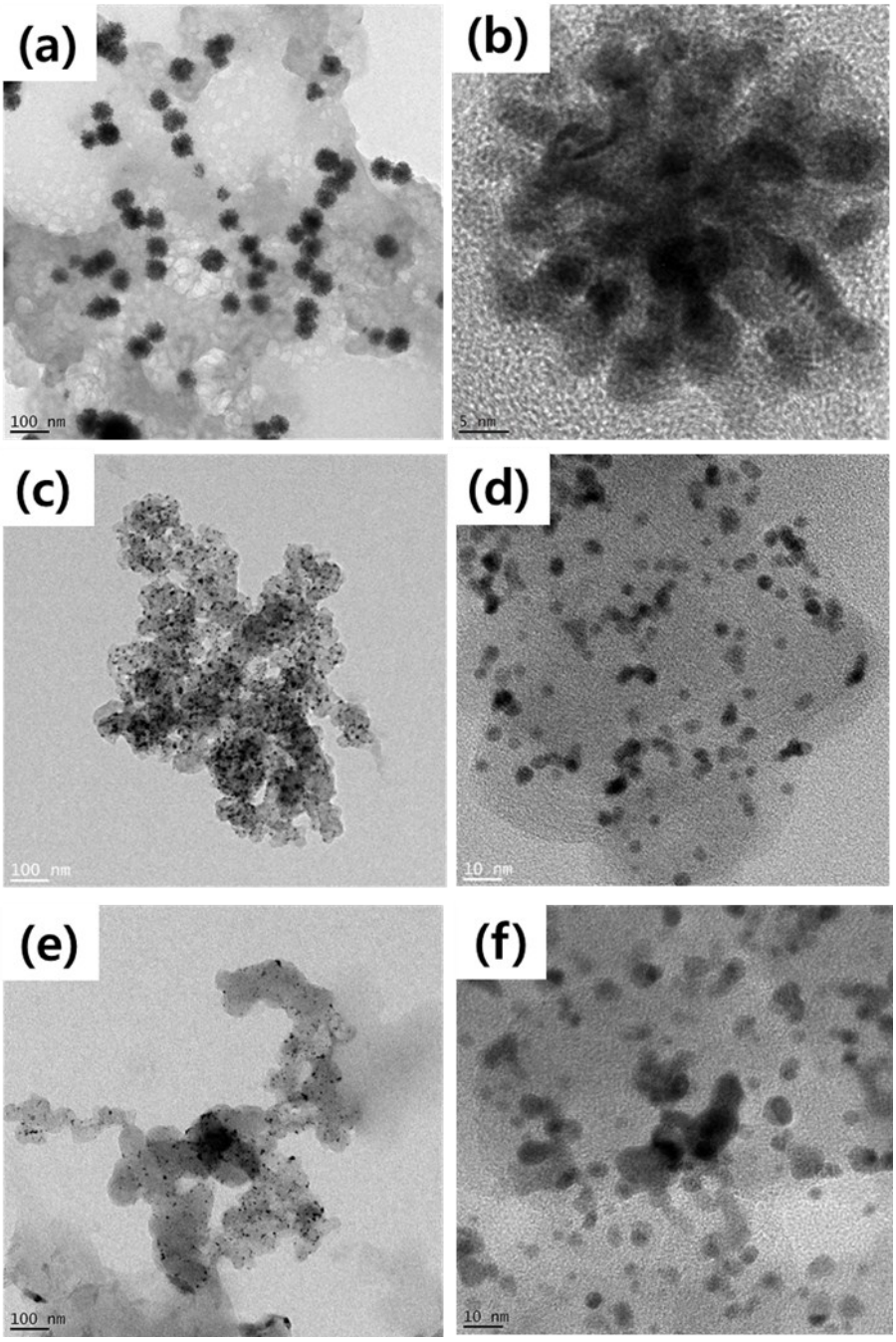

Figure S9. FE-TEM and HR-TEM images of (a and b) d-PtIr/C, (c and d) s-PtIr/C, and (e and f) Pt/C electrocatalysts after stability test in ORR, respectively.