Supplementary Information for

Oxidation-state dependent electrocatalytic activity of iridium nanoparticles supported on graphene nanosheets

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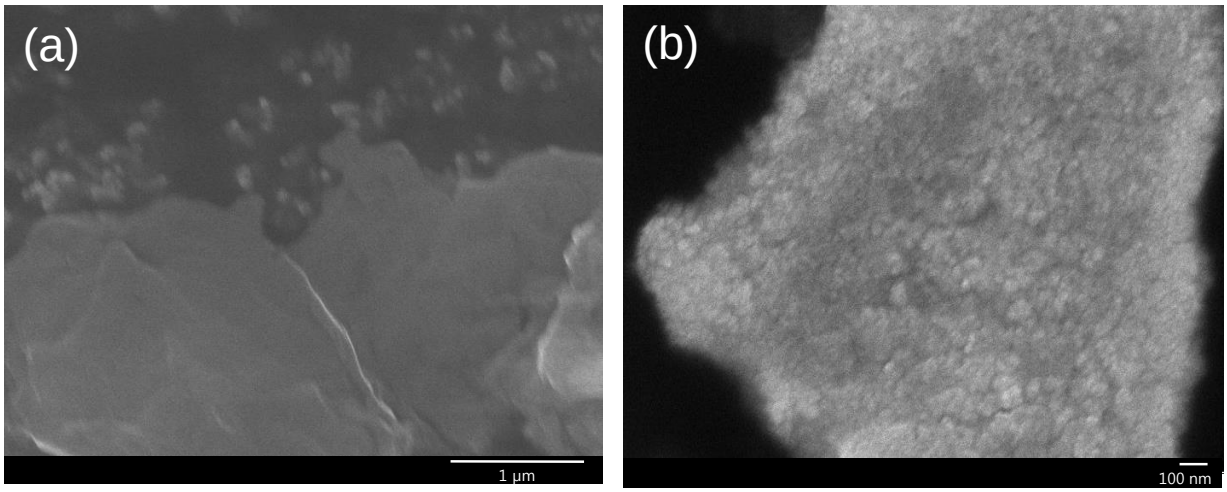

Fig. S1. Typical SEM images of (a) pRGO and (b) Ir NP/pRGO nanocomposites.

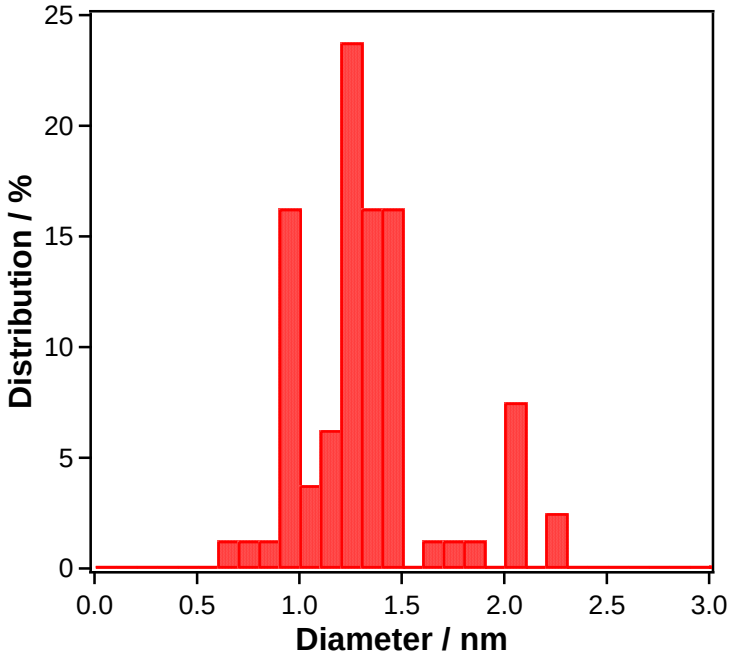

Fig. S2. Particle size distribution of the Ir nanoparticles immobilized on pRGO nanosheets.

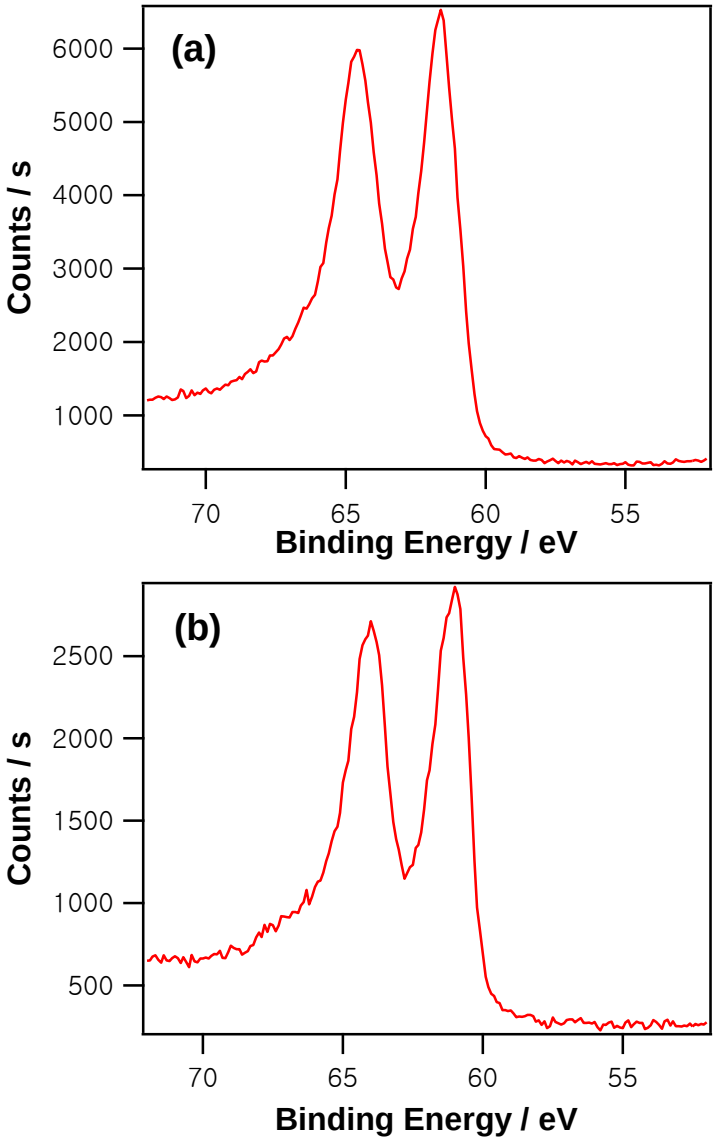

Fig. S3. XPS spectra of (a) Ir NP/pRGO-air and (b) Ir NP/pRGO-H_2 for Ir 4f region.

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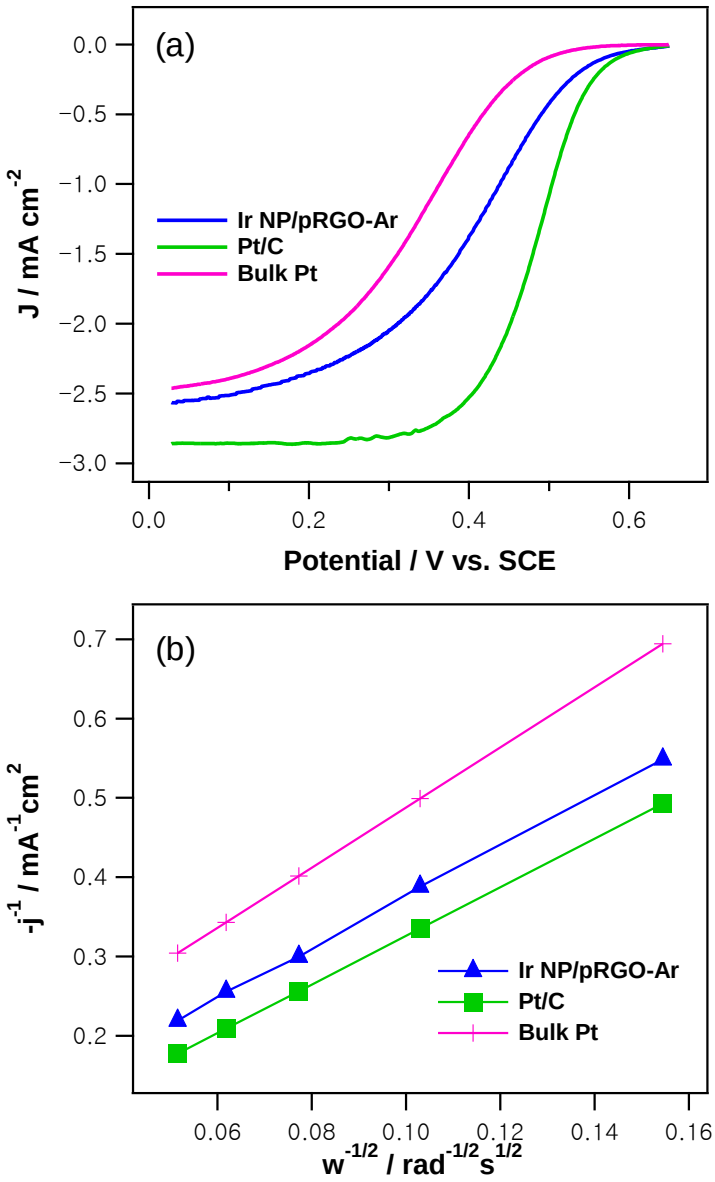

Fig. S4. Comparison of (a) RDE voltammograms and (b) K-L plots (at +0.1 V vs. SCE) for ORR in an O_2-saturated 0.5 M H_2SO_4 solution at GC electrodes modified with Ir NP/pRGO-Ar, commercial Pt/C, and bulk Pt (disk electrode, Pt disk diameter = 3 mm). Rotation speed, 900 rpm and scan rate, 10 mV s^{-1}. Current densities (*J*) were obtained via the current normalization with respect to the corresponding electrode GSA, as determined by the CC method.

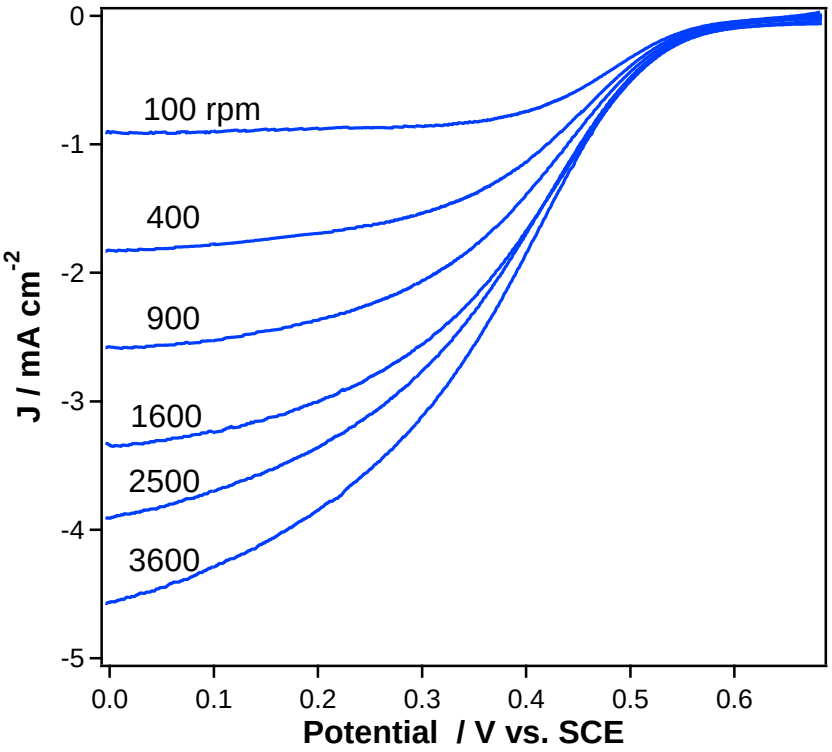

Fig. S5. RDE voltammograms for ORR in an O_2-saturated 0.5 M H_2SO_4 solution at the Ir NP/pRGO-Ar-modified GC electrode depending on rotation speed with a scan rate of 10 mV s^{-1}.

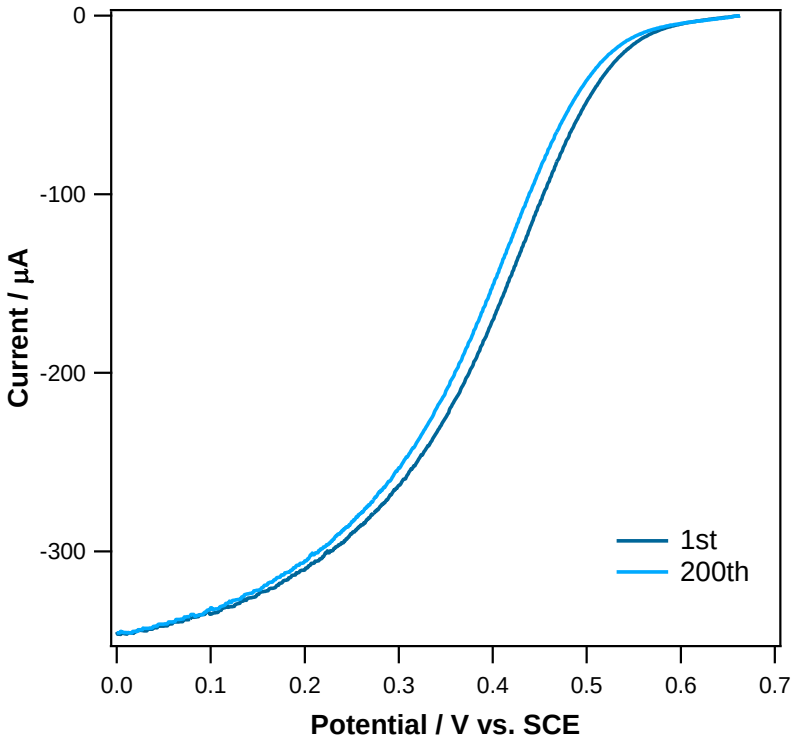

Fig. S6. RDE voltammograms before and after repetitive 200 runs obtained with Ir NP/pRGO-Ar-modified GC electrode in an O_2-saturated 0.5 M H_2SO_4 solution at a rotation rate of 1600 rpm. All the other conditions are the same as in Figure 5.