Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Tailoring iridium-palladium nanoparticles with Ir-rich skin: a highly durable anode electrocatalyst for acidic water electrolysis via a facile microwave-assisted chemical reduction method

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Supporting Information S1

Advanced microscopies

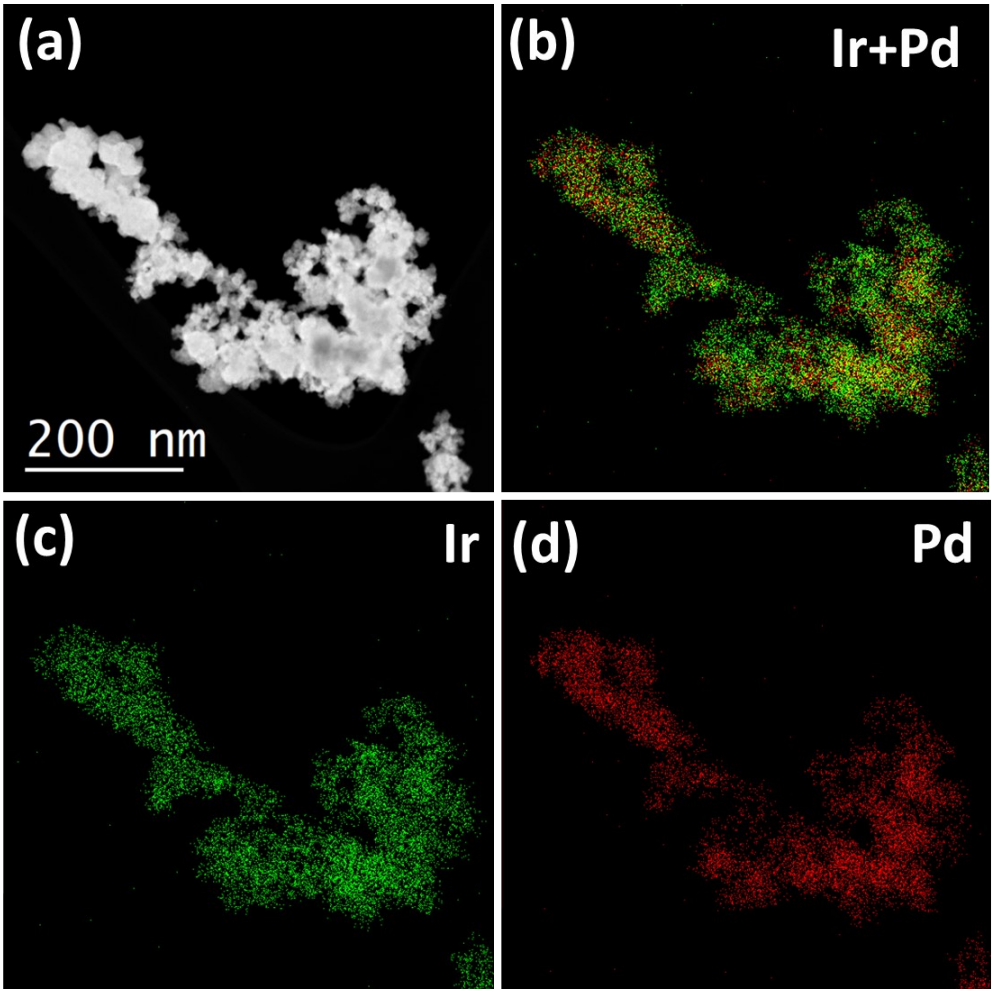

Figure S1: (a) HAADF STEM image of IrPd-1:1 and corresponding EDXS elemental mapping of (b) Ir+Pd, (c) Ir and (d) Pd elements.

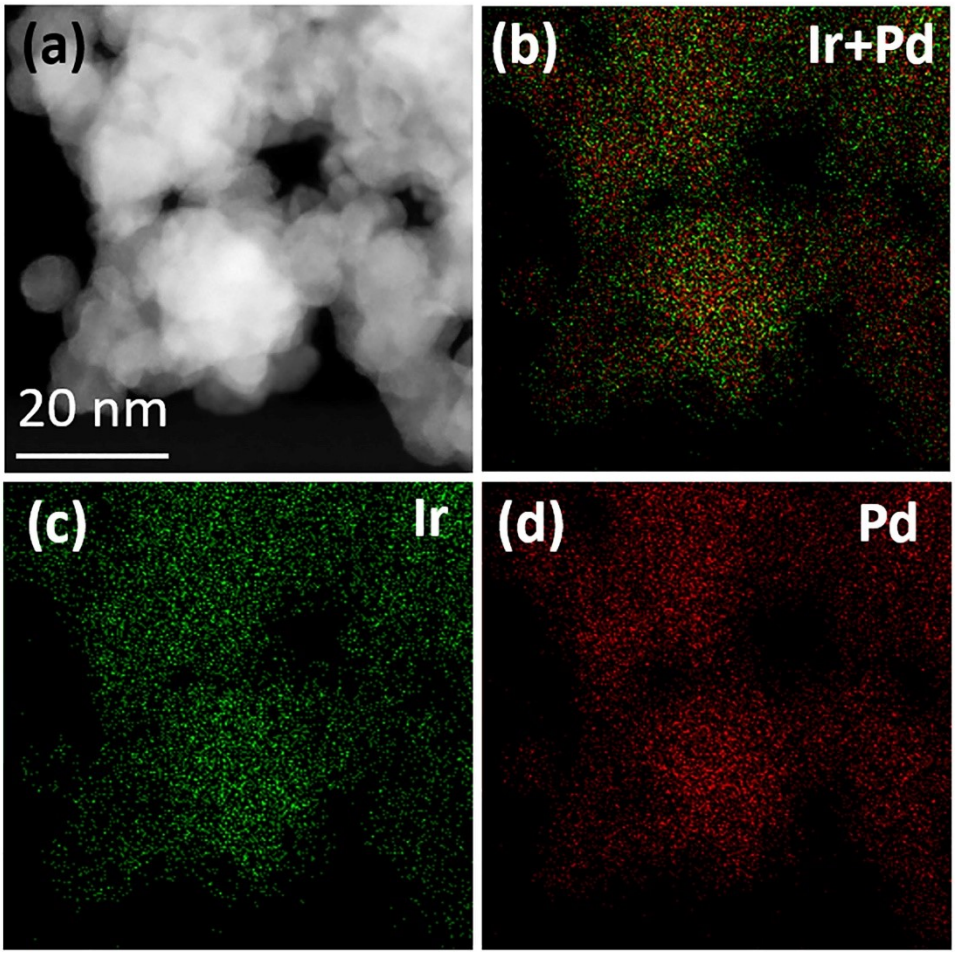

Figure S2: (a) HAADF STEM image of IrPd-1:3 and corresponding EDXS elemental mapping of (b) Ir+Pd, (c) Ir and (d) Pd elements.

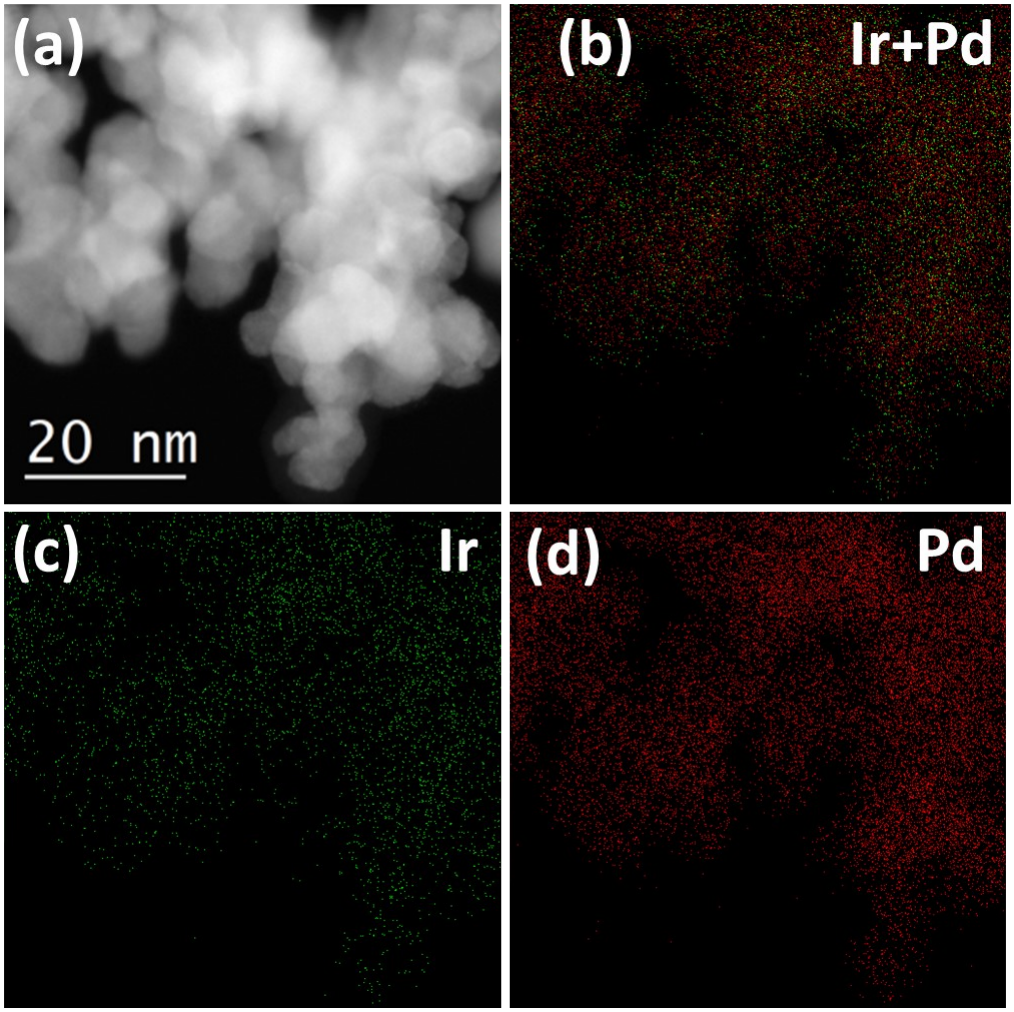

Figure S3: (a) HAADF STEM image of IrPd-1:9 and corresponding EDXS elemental mapping of (b) Ir+Pd, (c) Ir and (d) Pd elements.

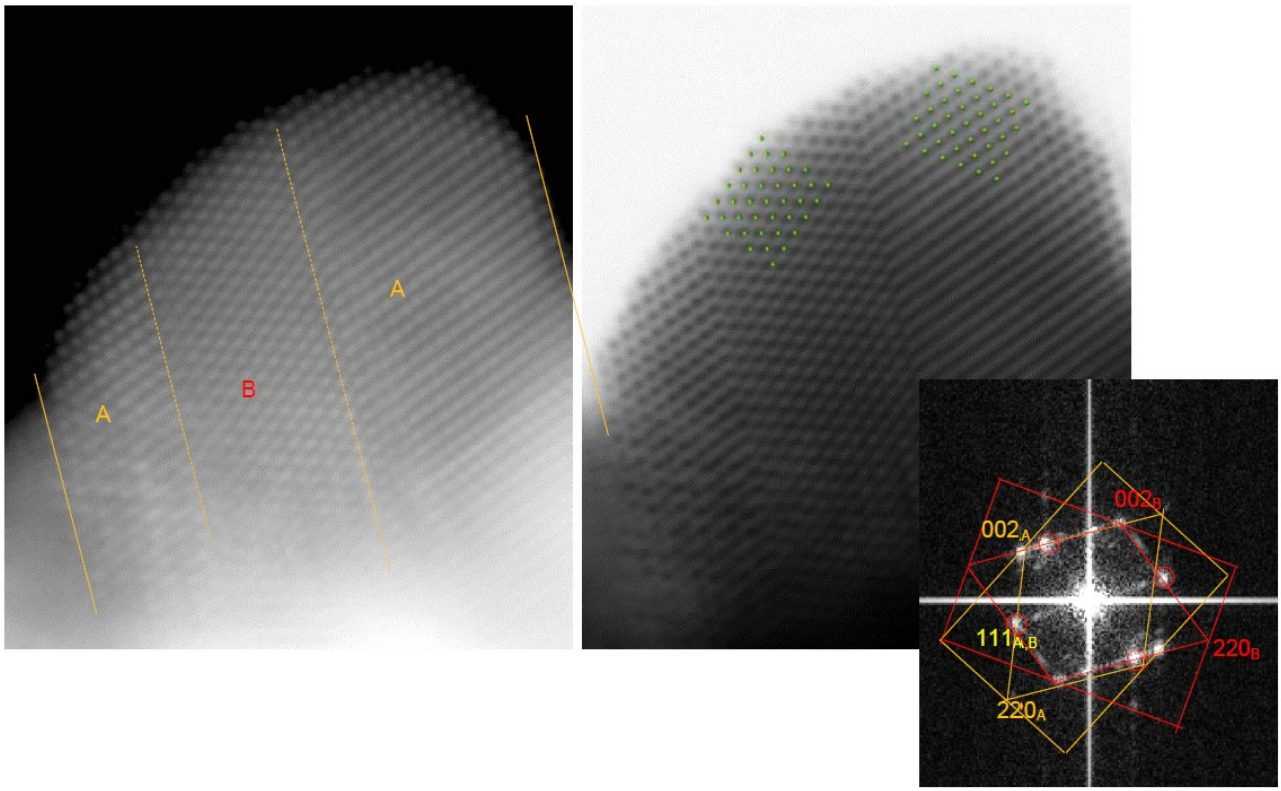

Figure S4: STEM image of IrPd-1:1 sample. The structure is consistent with Ir/Pd (111) twin oriented close to <110> direction. The projected structural model of fcc Pd is superimposed over the image to illustrate the positions of the Pd/Ir atoms.

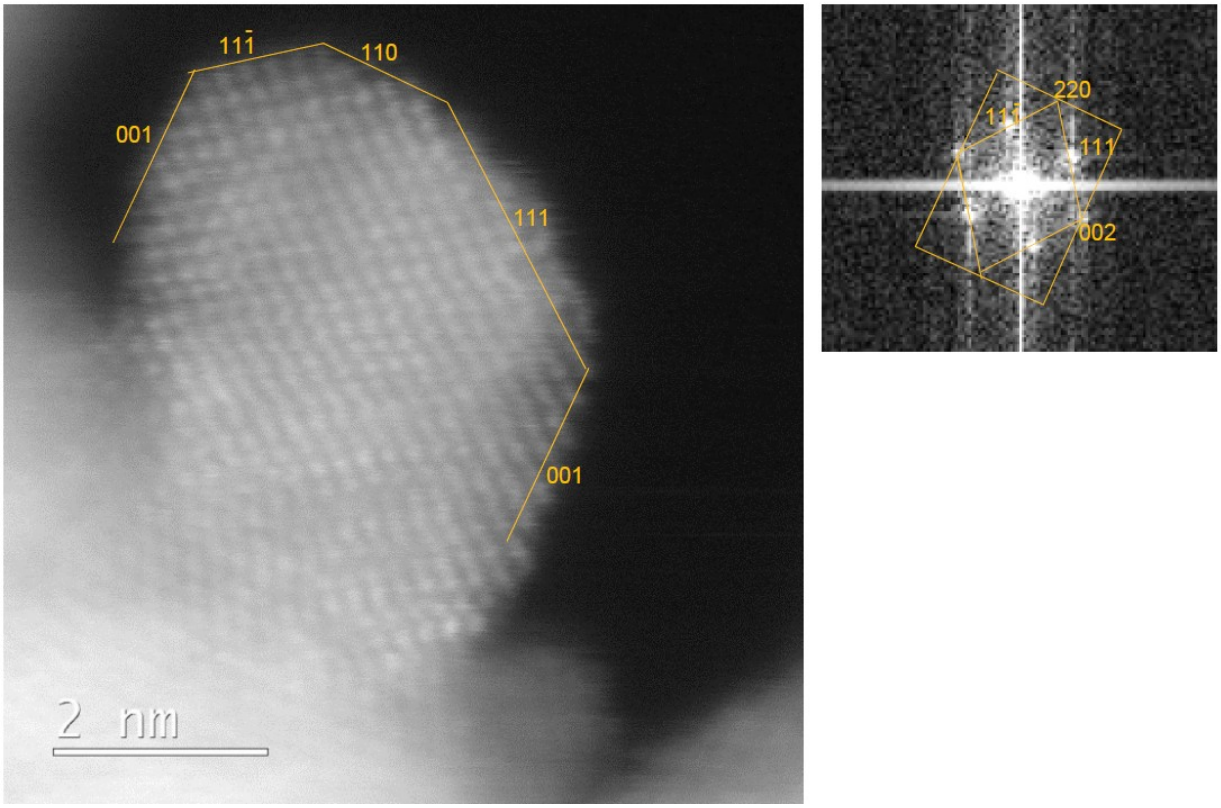

Figure S5: STEM image of IrPd-1:9 samplew ith a corresponding FFT image shows a shape of decagon (i.e., {110} and {100} truncated octahedra)

Supporting Information S2

Potential dependent current density

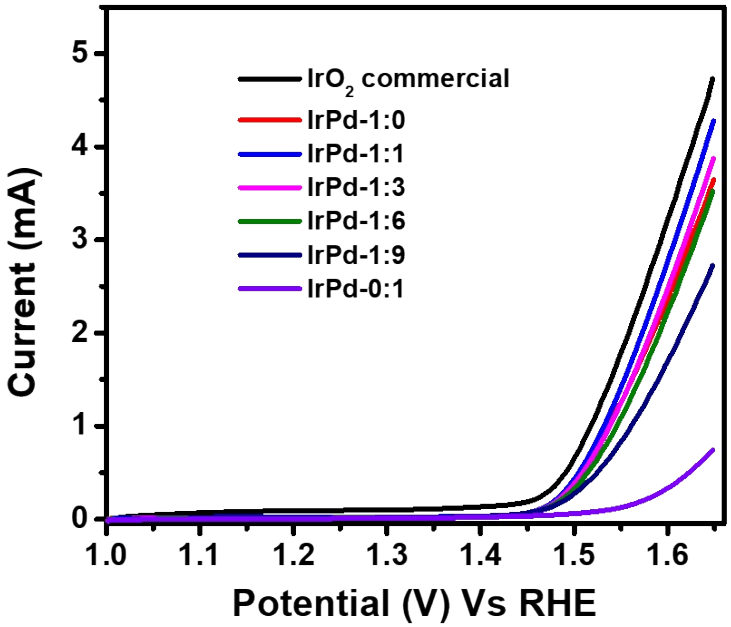

Figure S6: Shows OER performance in the form of potential dependent current density.

Supporting Information S3

Effect of Ir loading

Using IrPd-1:0 catalysts with varying loadings, the influence of pure Ir content on OER activity was assessed. Figure S7(a) illustrates OER polarization curves with varying Ir loading in 0.1 M $HClO_4$. Surprisingly, the current response decreases with increase Ir loading. Figure S7(b) depicts the mass activity response to Ir loading at 1.6 V. Thus, total use of Ir active sites occurs at lower Ir loading, resulting in increased current response. The mass activity of IrPd alloys with varying Ir loadings was found to be greater (2.3 times) than lower Ir loadings, confirming the synergistic effect of Ir and Pd.

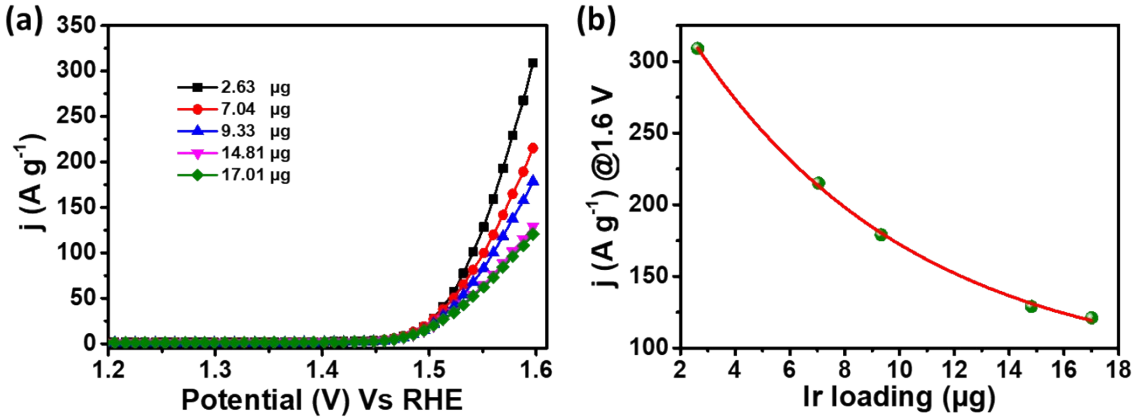

Figure S7: (a) OER polarization curves at different Ir loadings (b) Corresponding mass activity at 1.6 V.

Supporting Information S4

Accelerated Stress Test (AST)

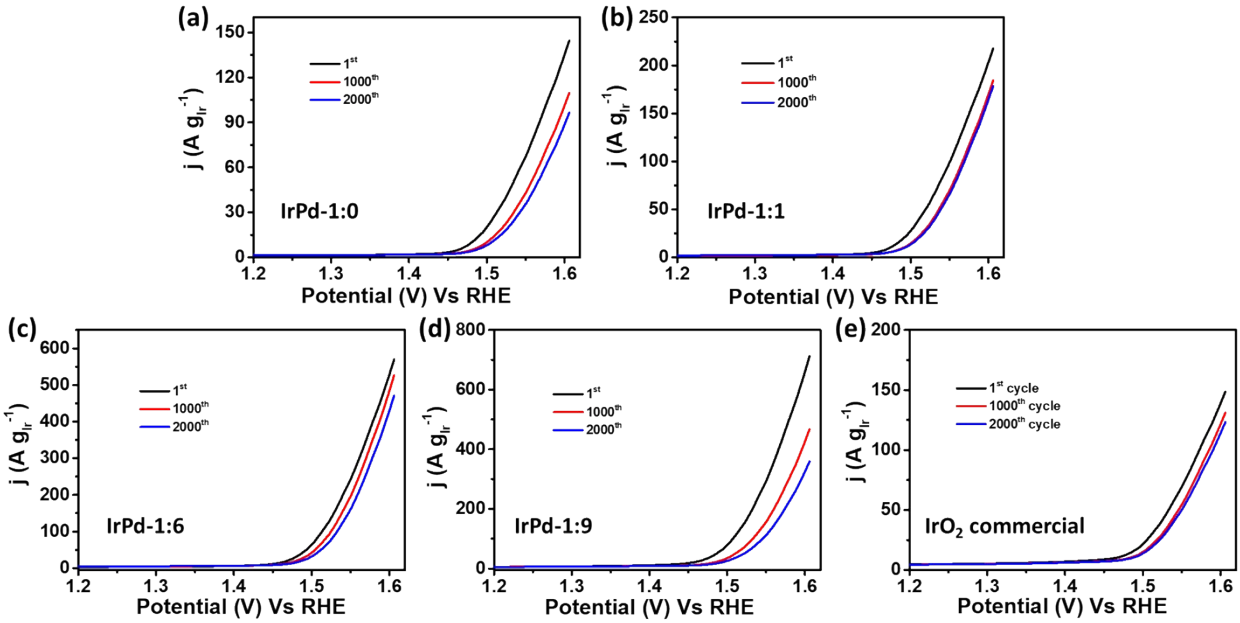

Figure S8: OER polarization curves performed for 2000 cycles at 100 mV s^{-1} scan rate and recorded at 10 mV s^{-1} for (a) IrPd-1:0, (a) IrPd-1:1, (a) IrPd-1:6, (a) IrPd-1:9, and (a) IrO_2 commercial catalyst at 1^{st}, 1000^{th}, and 2000^{th} OER cycles