

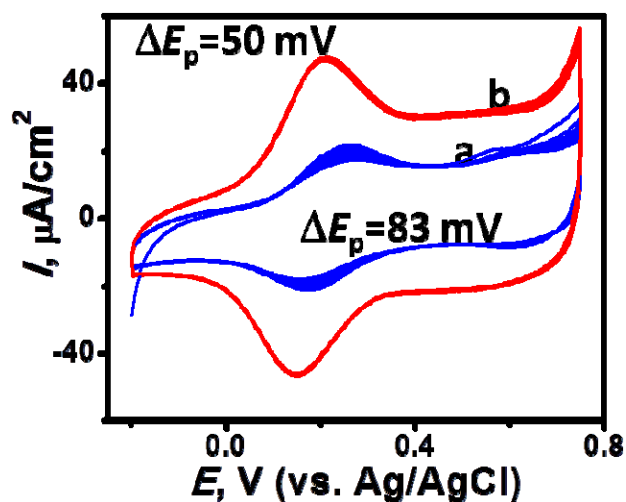
## Supporting Information

### Efficient Electrocatalytic Oxidation of Water: Minimization of Catalyst Loading via an Electrostatic Assembly of Hydrus Iridium Oxide Colloids

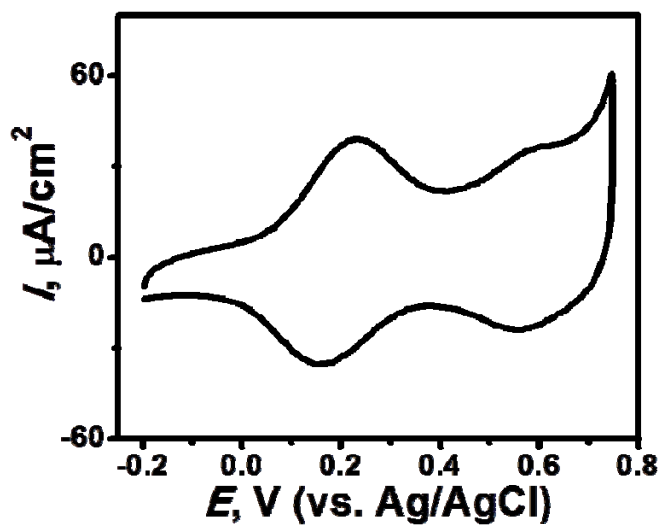
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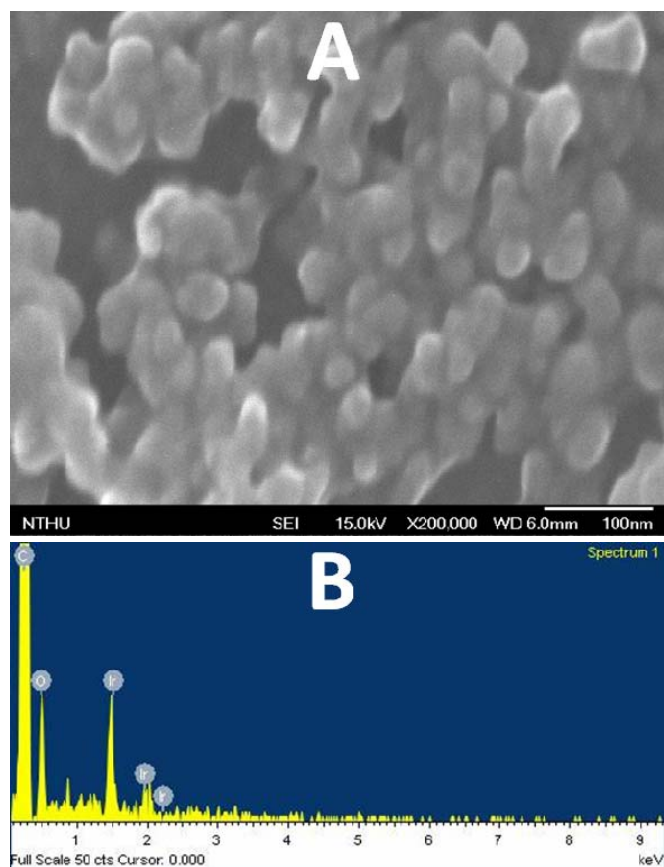
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**Figure S1** Cyclic voltammograms of iridium oxide colloid assembled (a) GCE and (b) PAH-functionalized GCE in a 0.05 M phosphate buffer (pH 7.2) measured in the potential range of -0.2 to 0.75 V (vs. Ag/AgCl) at 50 mV/s. Cyclic voltammetry was undertaken after a 15 min assembly under a 0.18 mM Ir-containing solution at pH 9.3. The waves characteristic to  $\text{Ir}^{\text{IV}}/\text{Ir}^{\text{III}}$  redox in curve (a) declined as an increase of sweep cycle and the time exposed to a blank buffer illustrating the gradual desorption. This phenomenon appeared to be a behavior in connection to an adsorption of the hydrus iridium oxide colloid onto GCE and the possible desorption in the colloid-deficient solution. In contrast, the iridium oxide colloid assembled PAH-functionalized GCE appeared to have prompted quantity of electroactive Ir sites, more stabilized CV curve, and enhanced reversibility (a  $\Delta E_p$  reduction from 83 to 50 mV).



**Figure S2** Cyclic voltammograms of an iridium oxide colloid assembled glassy carbon electrode in a 0.05 M phosphate buffer (pH 7.2) measured in the potential range of -0.2 to 0.75 V (vs. Ag/AgCl) at 50 mV/s. Iridium oxide colloidal solution was prepared pursuant to the protocol reported in [S1] and subsequently diluted to the solution containing 0.18 M Ir at pH 8.2 for the assembly process. Assembly time: 30 min.



**Figure S3** (A) Magnified image, examined by SEM, of an iridium oxide colloid adsorbed glassy carbon electrode assembled in 0.18 mM Ir-containing solution (pH 9.3) for 860 min, and (B) the corresponding EDS spectrum specifying the presence of iridium.

## *References*

S1. Zhao, Y., Vargas-Barbosa, N. M., Hernandez-Pagan, E. A., Mallouk, T. E. *Small* **2011**, *7*, 2087.