Supporting Information

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

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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 Ir^{IV}/Ir^{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 hydrous 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