Optimization of Oxygen Evolution Dynamics on RuO$_2$ via Controlling of Spontaneous Dissociation Equilibrium

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Temperature dependent EIS at $E @j= 10 \text{ mA cm}^{-2}$

![Graph showing electrochemical impedance spectroscopy for RuO$_2$ under different temperature @j= 10 mA cm$^{-2}$.](image)

**Figure S1** Electrochemical impedance spectroscopy for RuO$_2$ under different temperature @j= 10 mA cm$^{-2}$.

Temperature dependent Tafel slope

![Graph showing Tafel curve for RuO$_2$ under different temperature.](image)

**Figure S2** Tafel curve for RuO$_2$ under different temperature.
The influence of ionic strength

Figure S3 The influence of ionic strength for OER performance. With adding supporting electrolyte, $E_{O-O}$ (insert) and OER catalytic activity decreases rapidly.

pH dependent Tafel slope

Figure S4 Tafel curve for RuO$_2$ in different concentration KOH electrolyte.
Faraday efficiency

**Figure S5** Faraday efficiency test using the RRDE method and the inset presents the test mechanism of the RRDE. $FE = \frac{|I_{\text{ORR}}|}{I_{\text{OER}} \cdot C_e}$. $C_e$: oxygen collection coefficient for RRDE (38.3%). (a) 0.1M KOH and 25°C; (b) 1M KOH and 50 °C.

**REFERENCES**

