

Supplementary Information

Oriented α -Fe₂O₃ and Fe₃O₄ Nanoporous Films Obtained by Topotactic-like Pseudomorphic Transformation of γ - and δ -FeOOH Films

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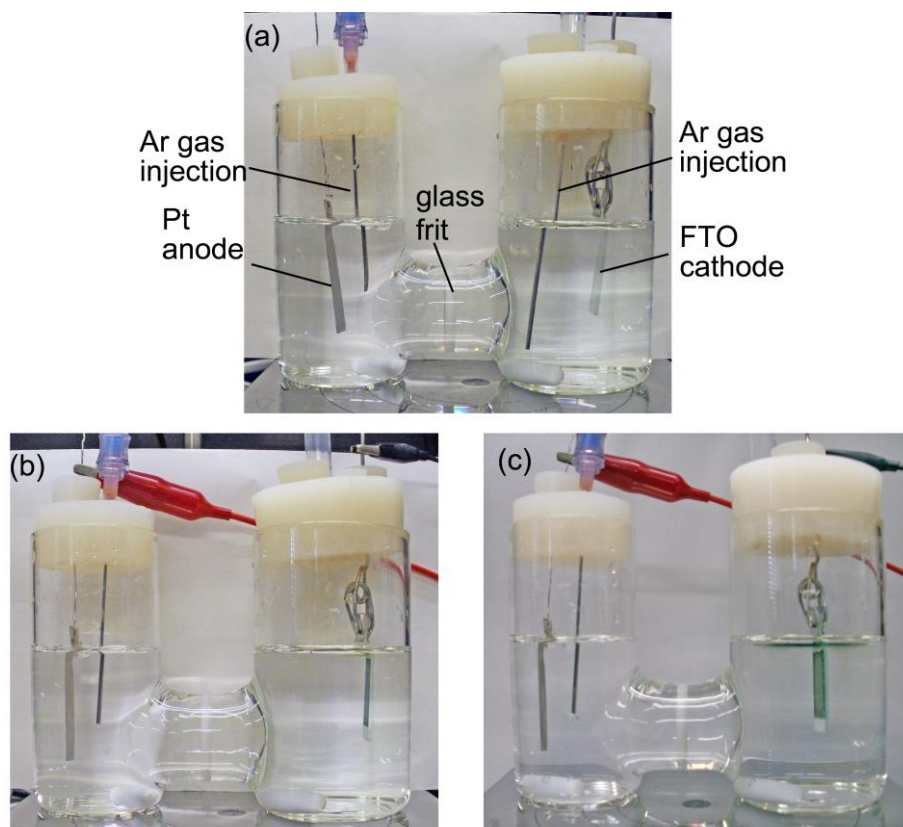


Figure S1. Photographs of the electrodeposition setup for growing GR films on FTO substrates using an H-type cell: (a) before electrodeposition, during electrodeposition at current densities of (b) 0.25 and (c) 4.0 mA cm⁻².

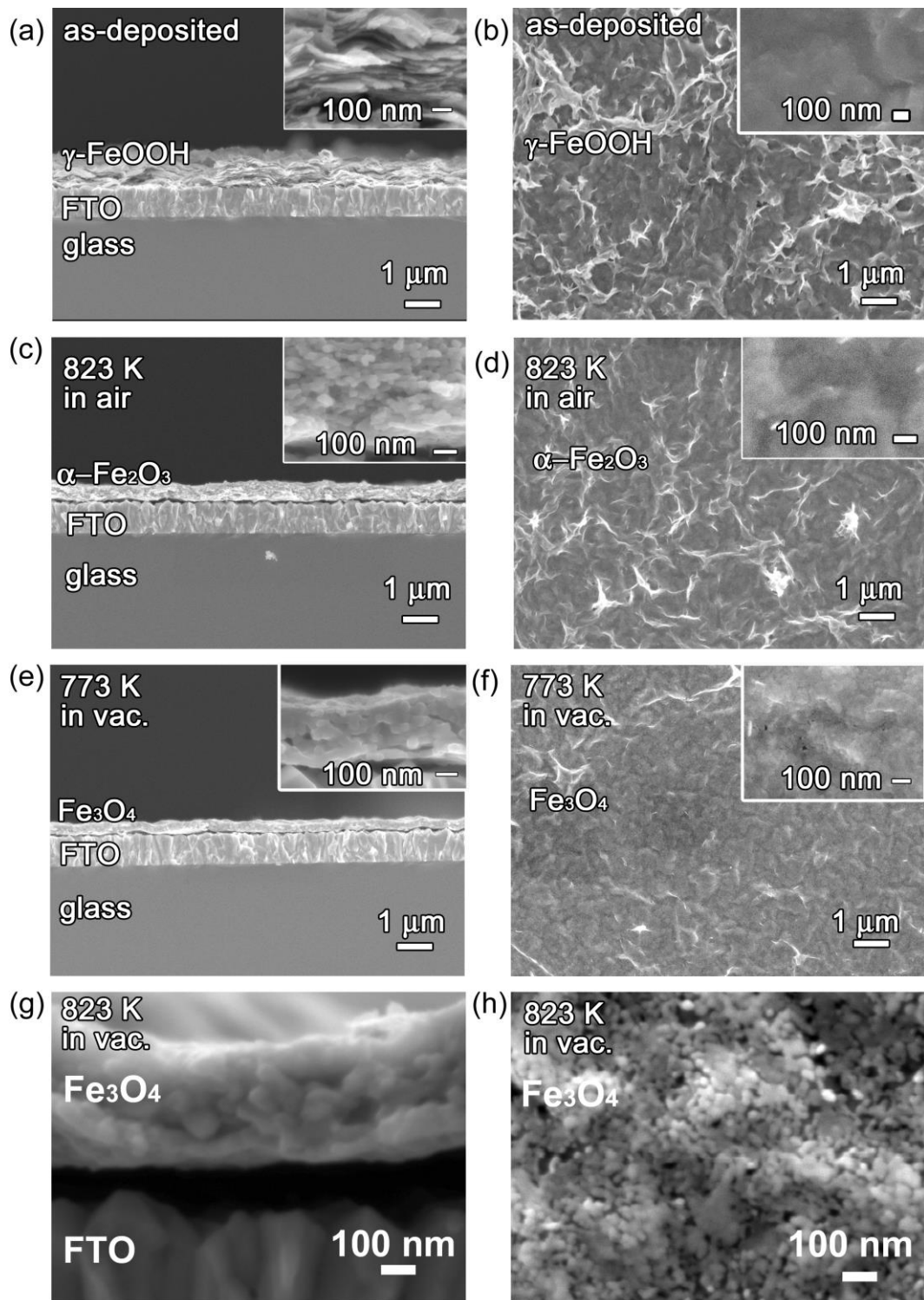


Figure S2. (a, c, e, g) Cross-sectional and (b, d, f, h) top-view FESEM images: (a, b) as-deposited [010]- γ -FeOOH films electrodeposited at 0.25 mA cm^{-2} , (c, d) (104)- and (116)- α - Fe_2O_3 films obtained by heating the γ -FeOOH films at 823 K in air and [110]- Fe_3O_4 films obtained by heating the γ -FeOOH films at (e, f) 773 and (g, h) 823 K in vacuum. Insets show magnified views.

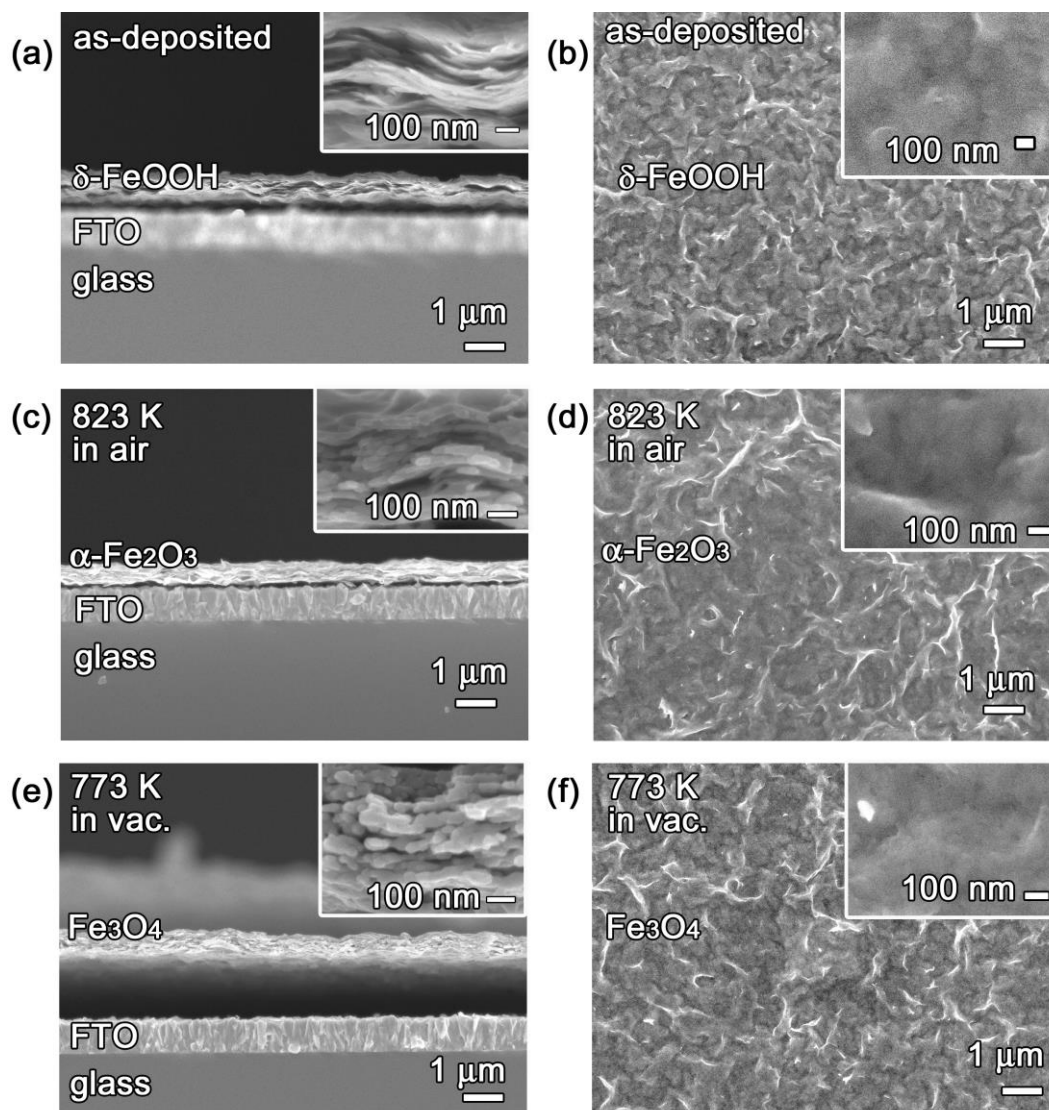


Figure S3. (a, c, e) Cross-sectional and (b, d, f) top-view FESEM images: (a, b) as-deposited [001]- δ -FeOOH films electrodeposited at 4.0 mA cm^{-2} , (c, d) [001]- α -Fe₂O₃ films obtained by heating the δ -FeOOH films at 823 K in air and (e, f) [111]-Fe₃O₄ films obtained by heating the δ -FeOOH films at 773 K in vacuum. Insets show magnified views.

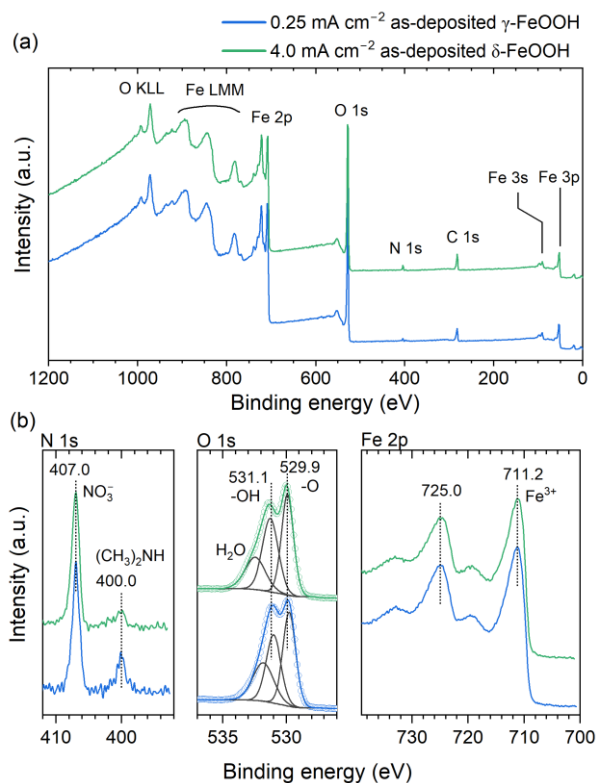


Figure S4. (a) wide-scan and (b) fine-scan XPS spectra of the as-deposited [010]- γ -FeOOH and [001]- δ -FeOOH films electrodeposited on FTO substrates at 0.25 and 4.0 mA cm⁻², respectively.

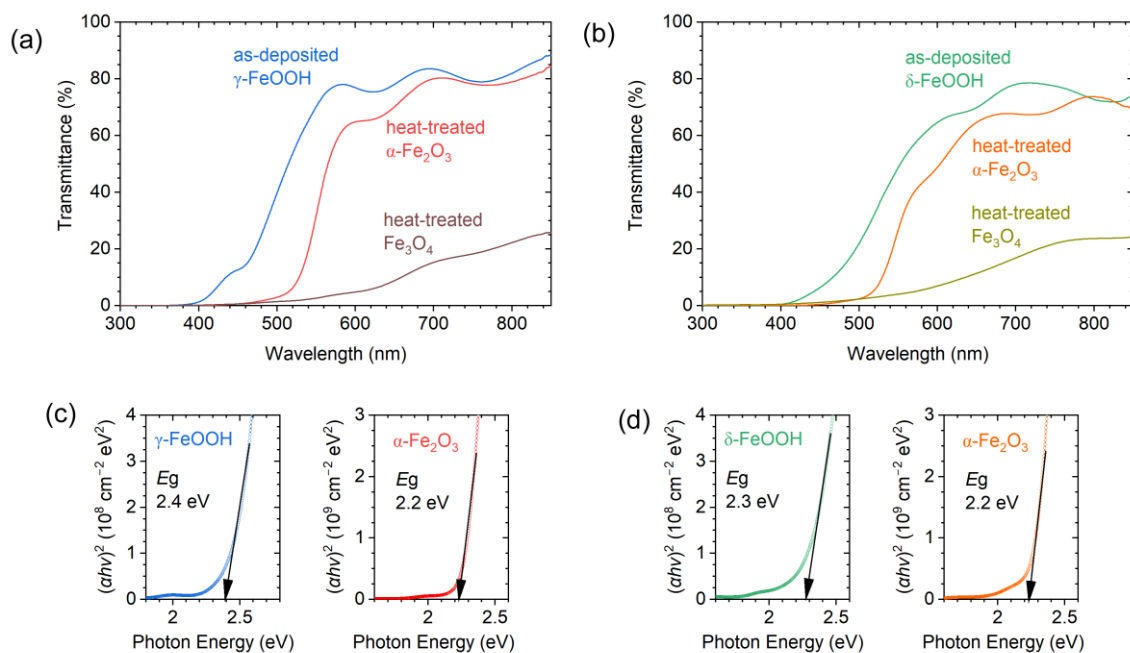


Figure S5. UV-vis transmittance spectra of a series of films electrodeposited at (a) 0.25 and (b) 4.0 mA cm⁻²: the as-deposited γ - and δ -FeOOH, heat-treated α -Fe₂O₃ and Fe₃O₄ films. (c, d) Tauc plots for the FeOOH and α -Fe₂O₃ films.

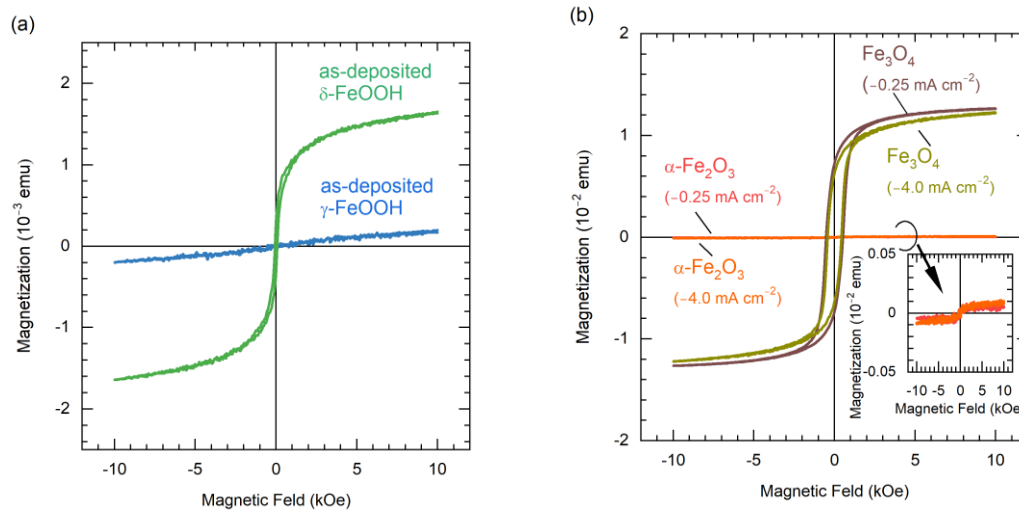


Figure S6. Magnetization curves measured at room temperature for the (a) as-deposited γ - and δ -FeOOH films electrodeposited at 0.25 and 4.0 mA cm⁻², (b) the heat-treated α -Fe₂O₃ and Fe₃O₄ films. The inset shows a magnified curves for the α -Fe₂O₃ films.