

Supporting Information

Investigating the Structural Evolution and Catalytic Activity of c-Co/Co₃Mo Electrocatalyst for Alkaline Hydrogen Evolution Reaction

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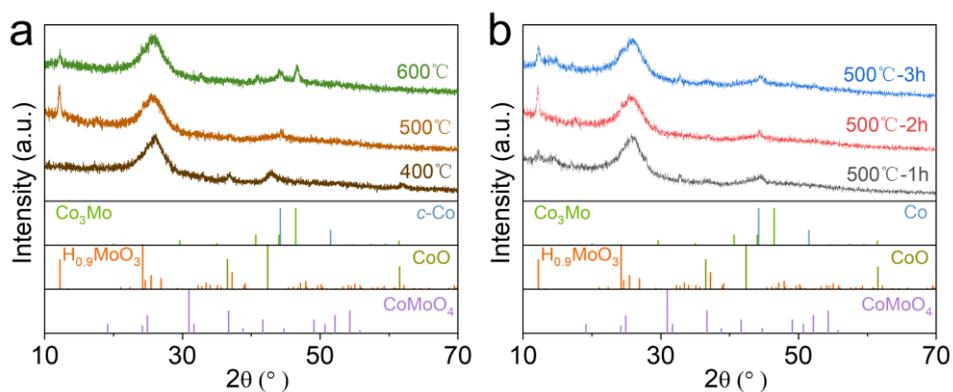


Figure S1. The XRD patterns of *c*-Co/Co₃Mo catalysts obtained by annealing sample-120°C-8h-0.5M at (a) 400°C, 500°C, and 600 °C for 2 h in a mixed hydrogen-argon flow, respectively; (b) 500 °C for 1, 2, and 3h in a mixed hydrogen-argon flow, respectively.

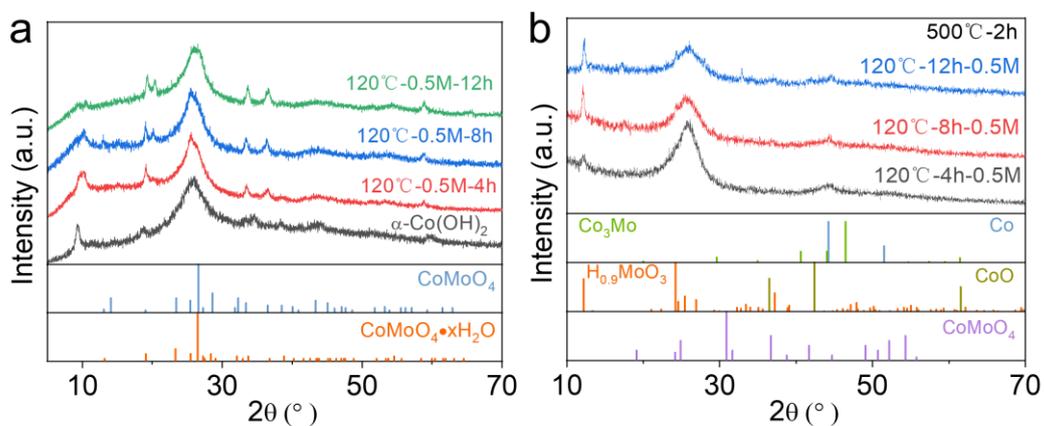


Figure S2. (a) The XRD patterns of sample-120°C-4h-0.5M, sample-120°C-8h-0.5M and sample-120°C-12h-0.5M. (b) The corresponding XRD patterns of catalysts annealed at 500 °C for 2 h in a mixed hydrogen-argon flow.

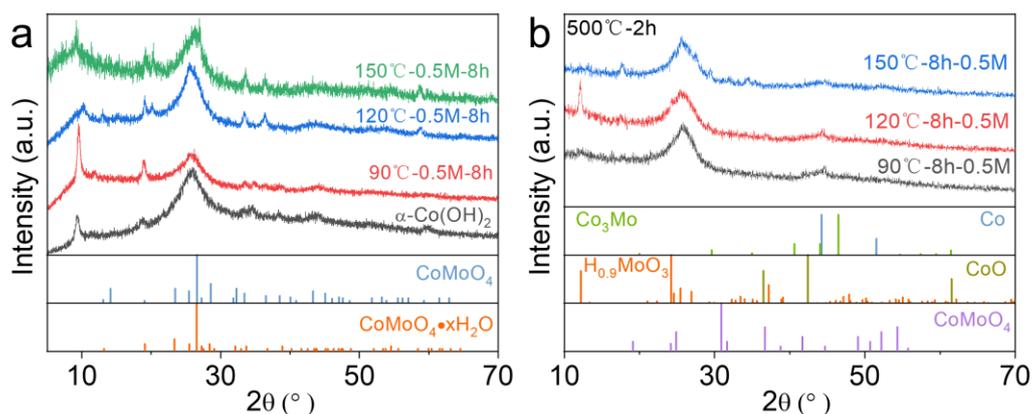


Figure S3. (a) The XRD patterns of sample-90°C-8h-0.5M, sample-120°C-8h-0.5M and sample-150°C-8h-0.5M. (b) The corresponding XRD patterns of catalysts annealed at 500 °C for 2 h in a mixed hydrogen-argon flow.

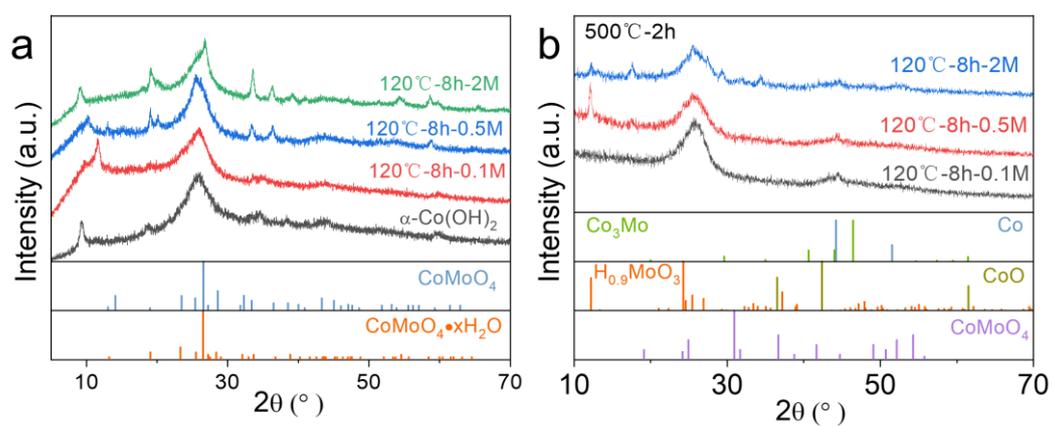


Figure S4. (a) The XRD patterns of sample-120°C-8h-0.1M, sample-120°C-8h-0.5M and sample-120°C-8h-2M. (b) The corresponding XRD patterns of catalysts annealed at 500 °C for 2 h in a mixed hydrogen-argon flow.

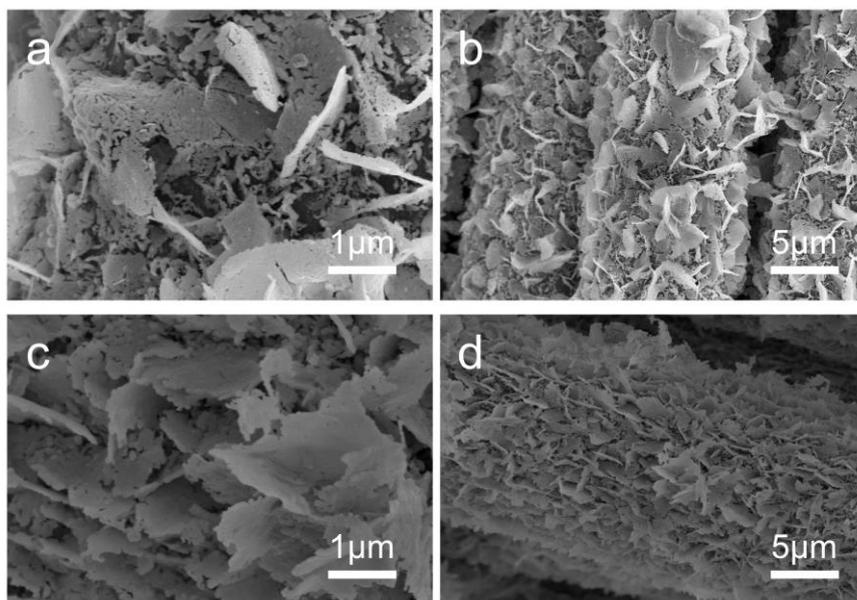


Figure S5. SEM images of catalysts obtained by annealing (a, b) sample-90°C-8h-0.5M and (c, d) sample-150°C-8h-0.5M at 500 °C for 2 h in a mixed hydrogen-argon flow, respectively.

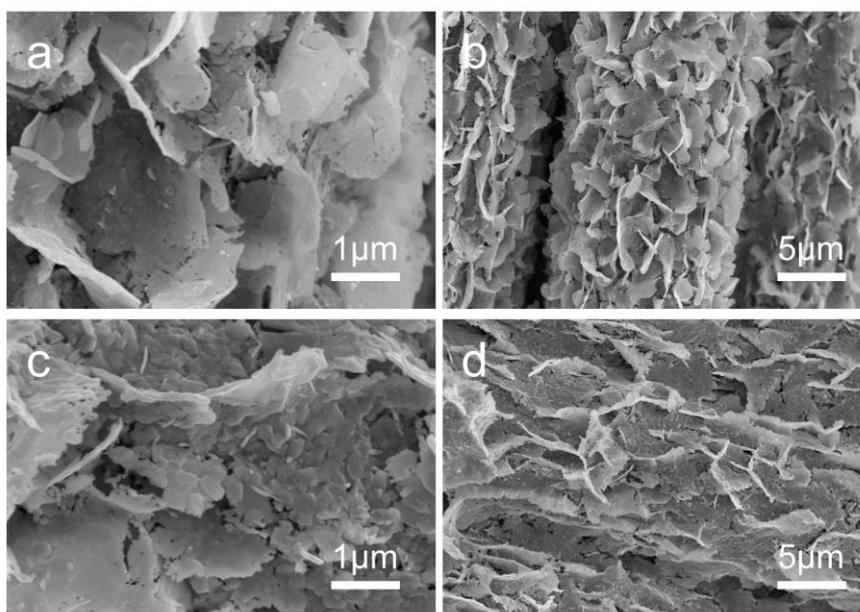


Figure S6. SEM images of catalysts obtained by annealing (a, b) sample-120°C-4h-0.5M and (c, d) sample-120°C-12h-0.5M at 500 °C for 2 h in a mixed hydrogen-argon flow, respectively.

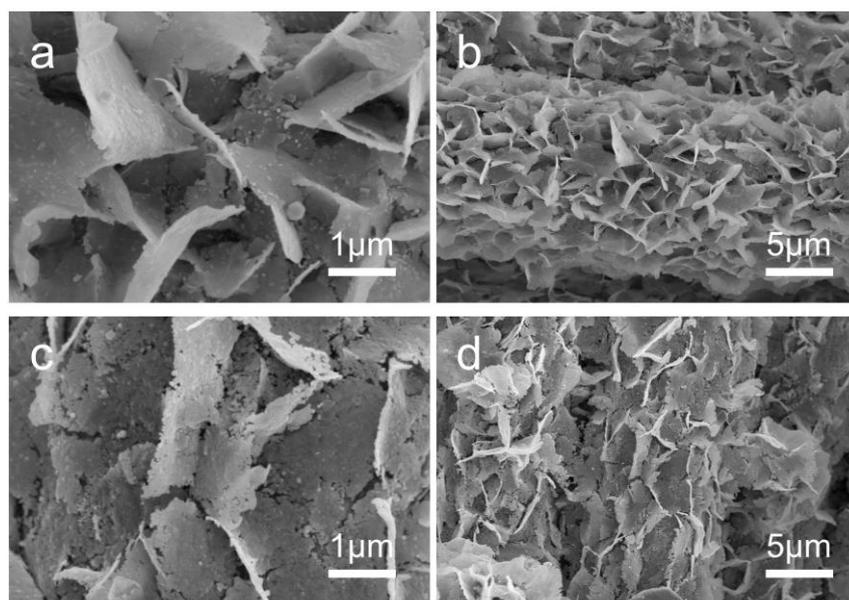


Figure S7. SEM images of catalysts obtained by annealing sample-120°C-8h-0.5M at (a, b) 400 °C and (c, d) 600 °C for 2 h in a mixed hydrogen-argon flow, respectively.

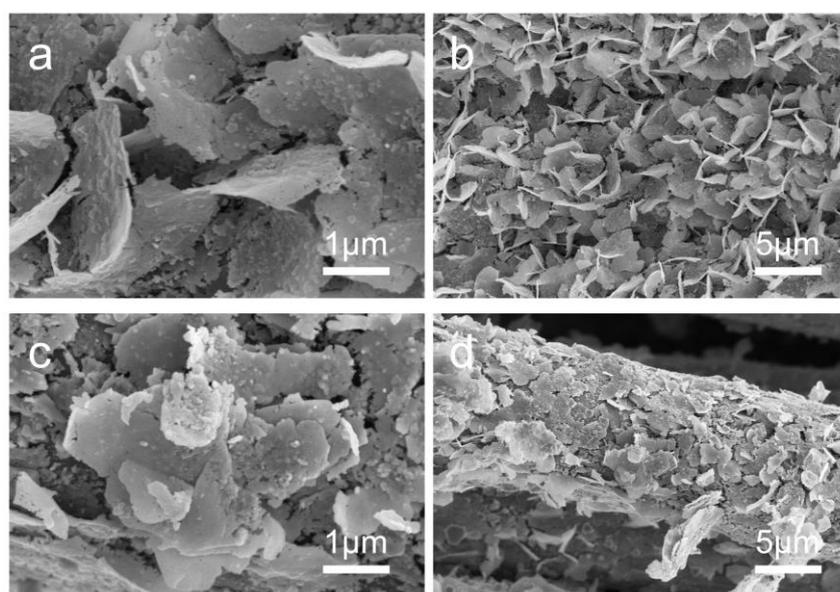


Figure S8. SEM images of catalysts obtained by annealing sample-120°C-8h-0.5M at 500 °C for (a, b) 1 h and (c, d) 3 h in a mixed hydrogen-argon flow, respectively.

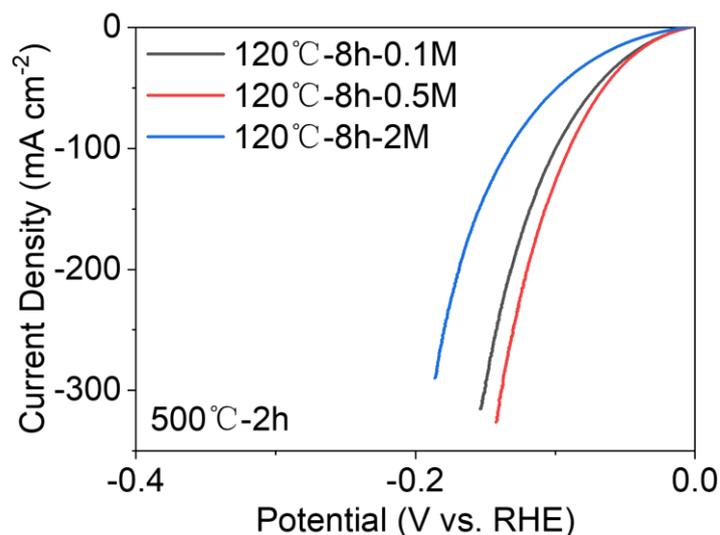


Figure S9. LSV curves of catalysts obtained by annealing sample-120°C-8h-0.1M, sample-120°C-8h-0.5M, and sample-120°C-8h-2M at 500 °C for 2 h in a mixed hydrogen-argon flow, respectively.

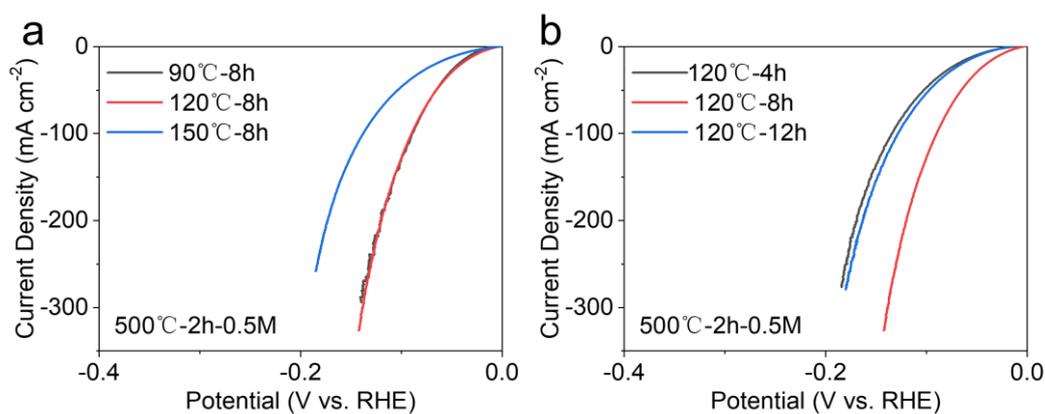


Figure S10. (a) LSV curves of catalysts obtained by annealing sample-90°C-8h-0.5M, sample-120°C-8h-0.5M, and sample-150°C-8h-0.5M at 500 °C for 2 h in a mixed hydrogen-argon flow, respectively. (b) LSV curves of catalysts obtained by annealing sample-120°C-4h-0.5M, sample-120°C-8h-0.5M, and sample-120°C-12h-0.5M at 500 °C for 2 h in a mixed hydrogen-argon flow, respectively.

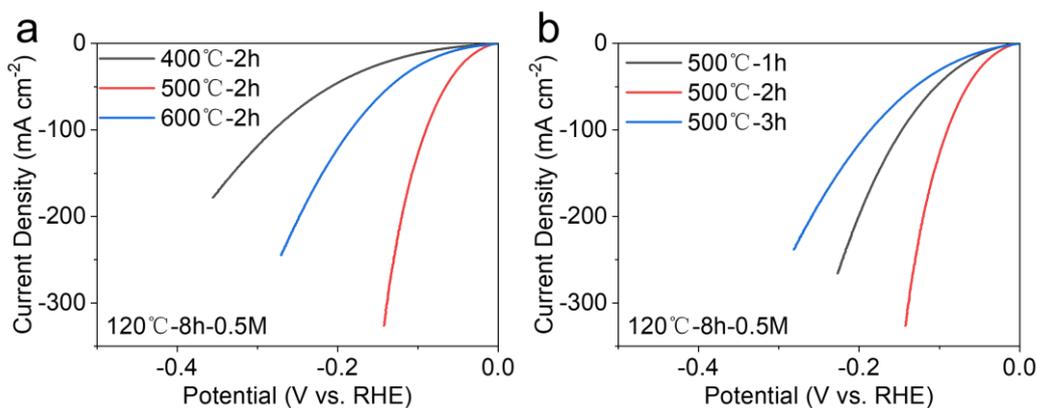


Figure S11. (a) LSV curves of catalysts obtained by annealing sample-120°C-8h-0.5M at 400, 500, and 600 °C for 2 h in a mixed hydrogen-argon flow, respectively. (b) LSV curves of catalysts obtained by annealing sample-120°C-8h-0.5M at 500 °C for 1, 2, and 3 h in a mixed hydrogen-argon flow, respectively.

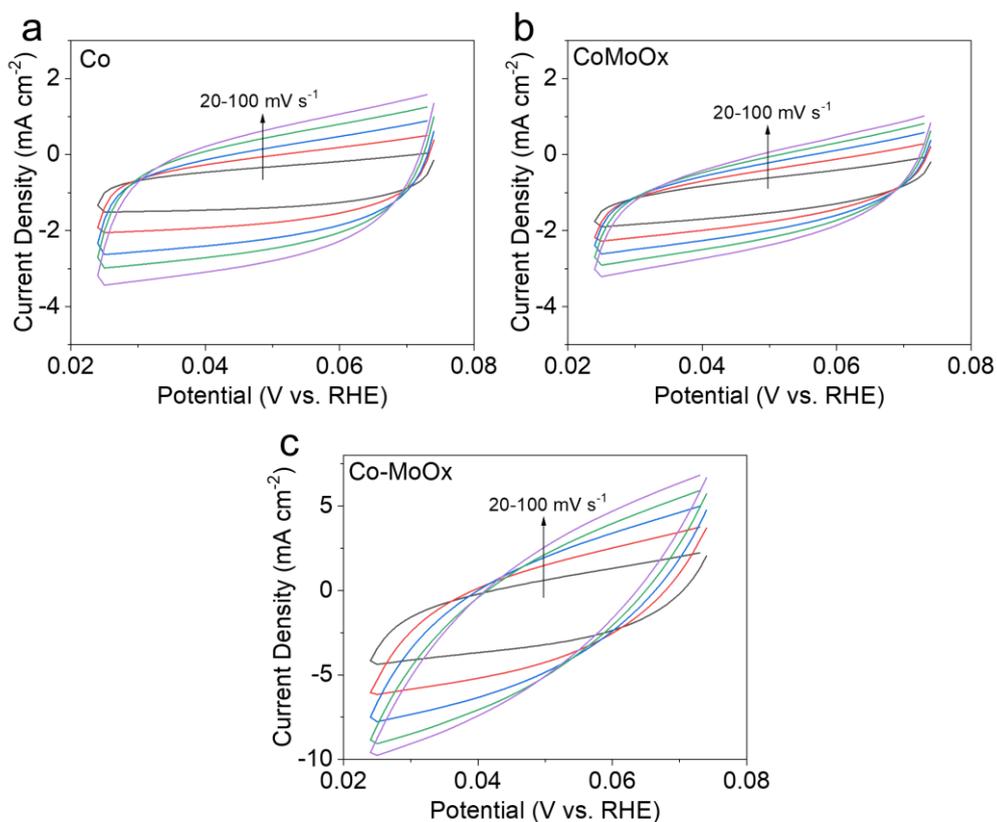


Figure S12. CV curves of (a) *c*-Co, (b) *c*-Co/Co₃Mo, and (c) Co₃O₄/CoMoO₄ at varied scan rates.

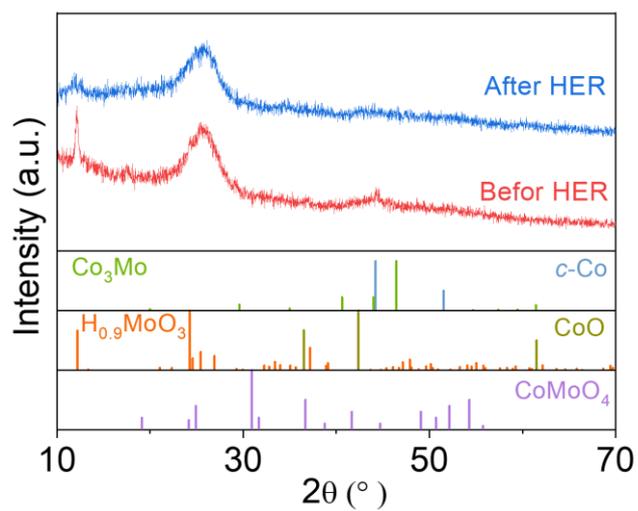


Figure S13. XRD patterns of *c*-Co/Co₃Mo before and after HER test.

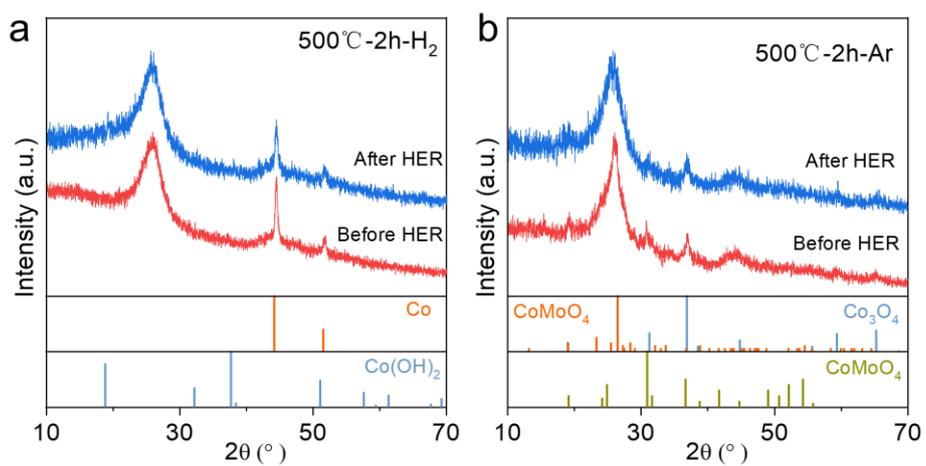


Figure S14. XRD patterns of (a) *c*-Co and (b) Co₃O₄/CoMoO₄ before and after HER test.

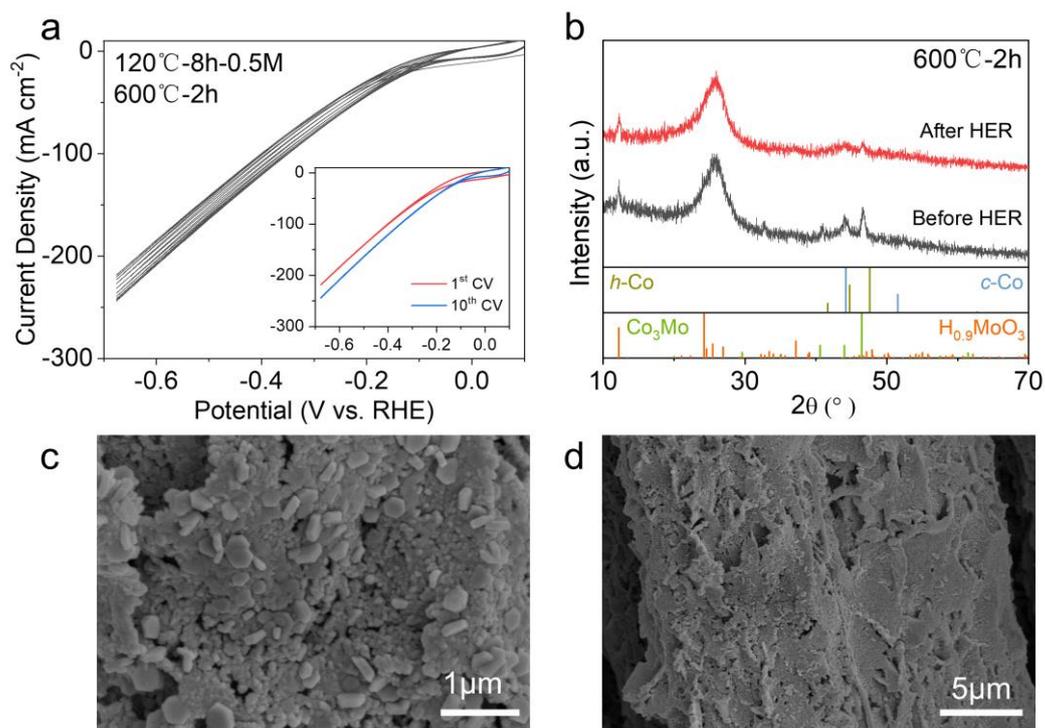


Figure S15. (a) Evolutive CV curves from the 1st to the 10th CV in 1 M KOH at 50 mV s^{-1} between 0.124 and -0.676 V (vs RHE), (b) XRD patterns, (c, d) The SEM image after HER test was obtained when the sample was annealed at $120^\circ\text{C}-8\text{h}-0.5\text{M}$, 600°C , in a hydrogen-argon mixed flow for 2 h.

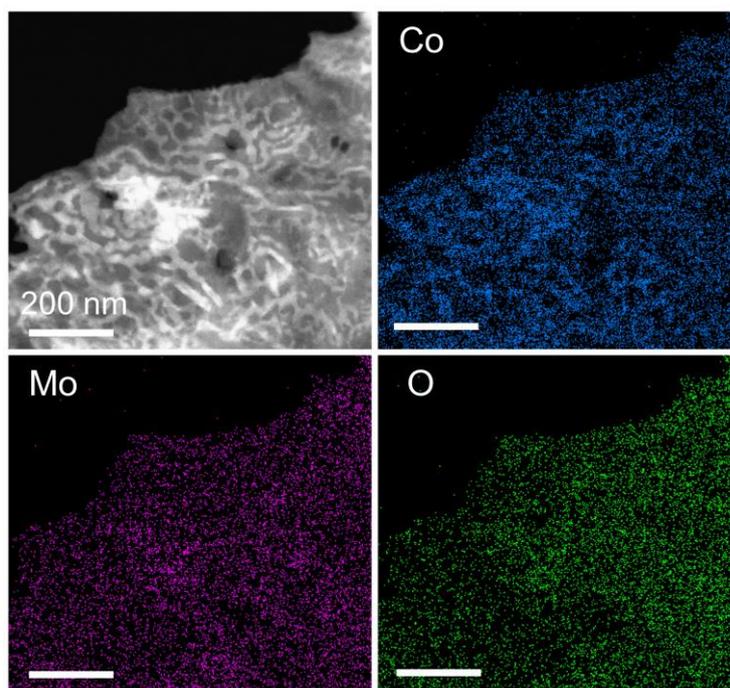


Figure S17. EDX elemental mapping images of *c*-Co/Co₃Mo after HER test.