Electronic Supplementary Material

Atomically ultrathin RhCo alloy nanosheets aggregates for efficient water electrolysis in broad pH range

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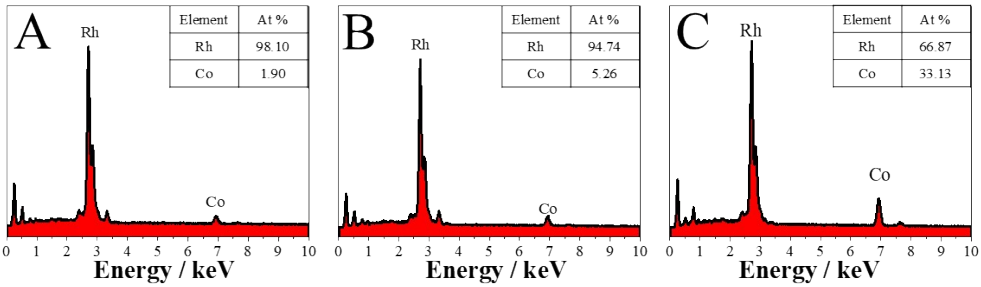

Fig. S1 EDX spectra of RhCo-ANAs obtained at (A) 160 °C, (B) 200 °C, and 240 °C, respectively.

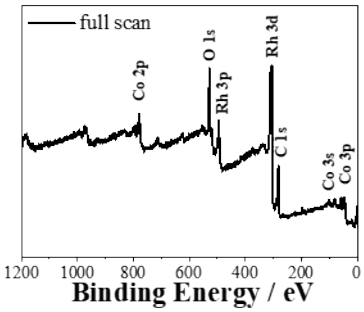

Fig. S2 XPS survey spectrum of RhCo-ANAs.

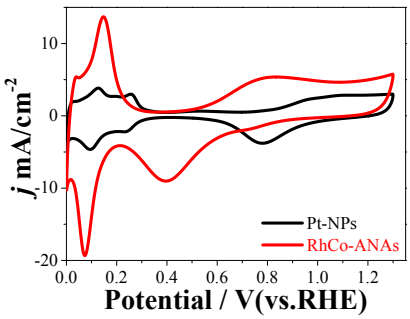

Fig. S3 CV curves of RhCo-ANAs and Pt-NPs in Ar-saturated 0.5 M H_2SO_4 solution at 50 mV s^{-1}.

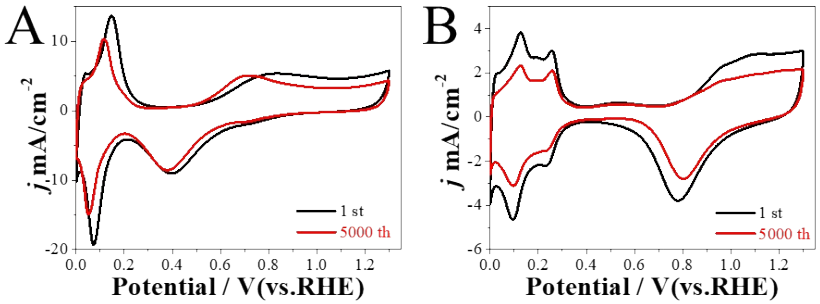

Fig. S4 CV curves of (A) RhCo-ANAs and (B) Pt-NPs in Ar-saturated 0.5 M H_2SO_4 solution at 50 mV s^{-1} before and after 5 000 scan cycles.

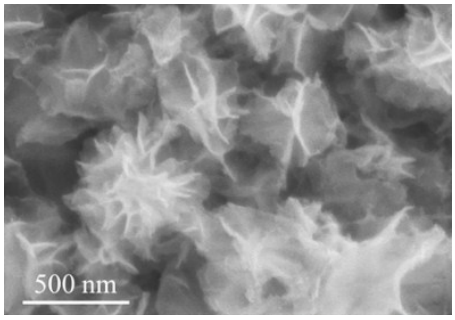

Fig. S5 SEM image of RhCo-ANAs after 5 000 scan cycles.

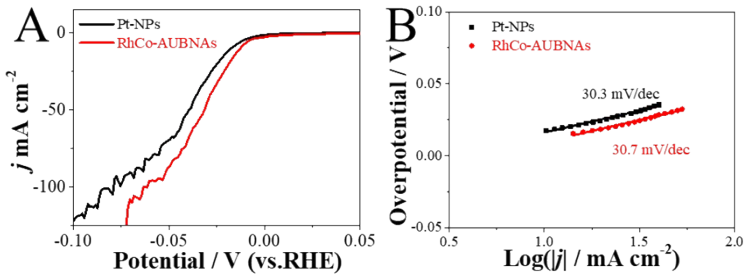

Fig. S6 (A) HER polarization curves of RhCo-ANAs and Pt-NPs in Ar-saturated 0.5 M H_2SO_4 solution at 5 mV s^{-1}. (B) Tafel plots of the HER at RhCo-ANAs and Pt-NPs in Ar-saturated 0.5 M H_2SO_4 solution.

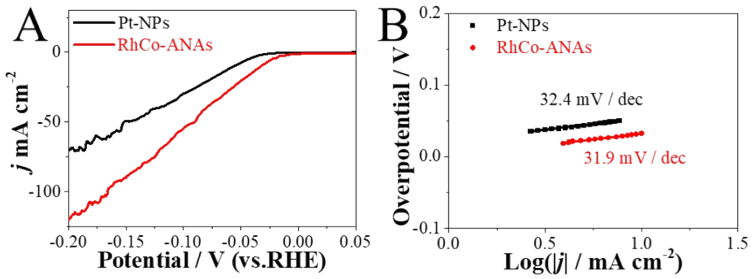

Fig. S7 (A) HER polarization curves of RhCo-ANAs and Pt-NPs in Ar-saturated 1.0 M KOH solution at 5 mV s^{-1}. (B) Tafel plots of HER at RhCo-ANAs and Pt-NPs in Ar-saturated 1.0 M KOH solution.

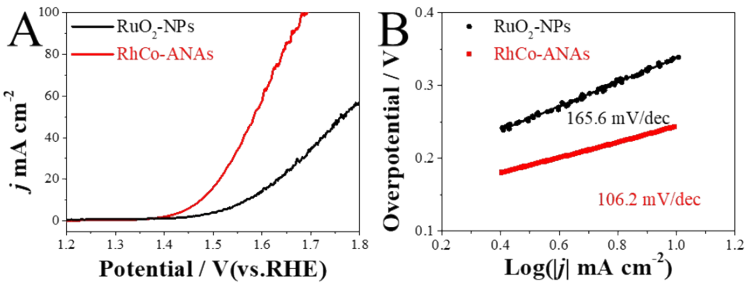

Fig. S8 (A) OER polarization curves of RhCo-ANAs and RuO_2-NPs in Ar-saturated 0.5 M H_2SO_4 solution at 5 mV s^{-1} and (B) Tafel plots of RhCo-ANAs and RuO_2-NPs.

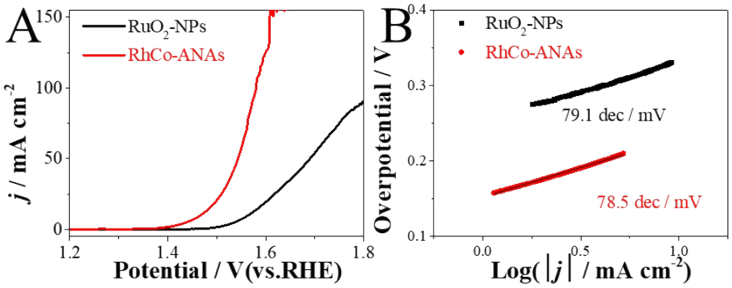

Fig. S9 (A) OER polarization curves of RhCo-ANAs and RuO_2-NPs in Ar-saturated 1.0 M KOH solution at 5 mV s^{-1} and (B) Tafel plots of RhCo-ANAs and RuO_2-NPs.

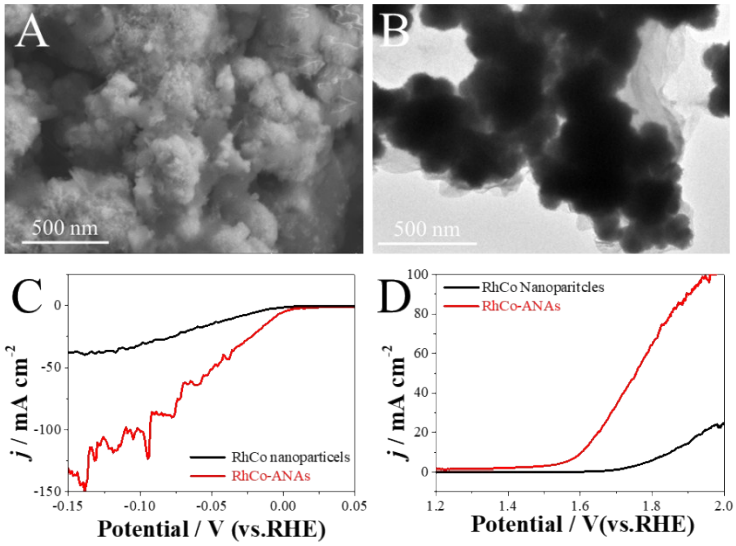

Fig. S10. (A) SEM and (B) TEM images of spherical RhCo nanoparticles. (C) HER polarization curves of RhCo-ANAs and spherical RhCo nanoparticles in Ar-saturated 1.0 M PBS solution at 5 mV s^{-1}. (D) OER polarization curves of RhCo-ANAs and spherical RhCo nanoparticles in Ar-saturated 1.0 M PBS solution at 5 mV s^{-1}. Herein, spherical RhCo nanoparticles are obtained by using $RhCl_3$ and $CoCl_2$ as reaction precursors and HCHO as reducing agent at 240 ^oC for 6 h.

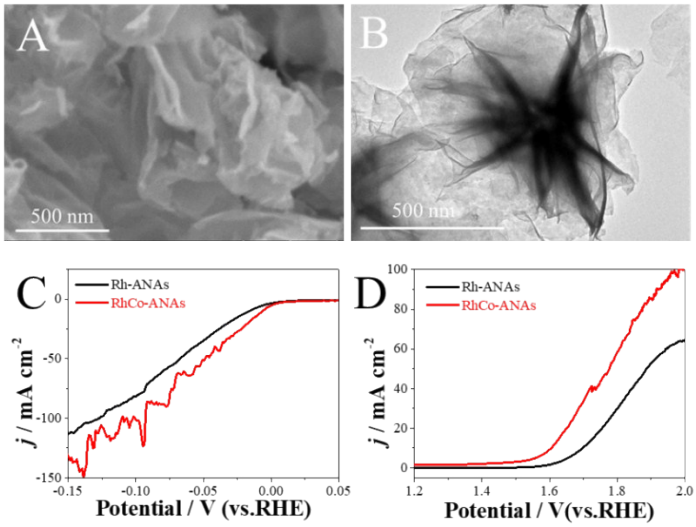

Fig. S11 (A) SEM and (B) TEM images of Rh-ANAs. (C) HER polarization curves of RhCo-ANAs and monometallic Rh-ANAs in Ar-saturated 1.0 M PBS solution at 5 mV s^{-1}. (D) OER polarization curves of RhCo-ANAs and monometallic Rh-ANAs in Ar-saturated 1.0 M PBS solution at 5 mV s^{-1}. Herein, Rh-ANAs was obtained by selecting reaction temperature at 160 °C (Fig. S1A)

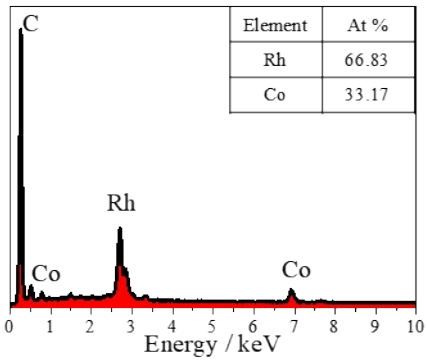

Fig. S12 EDX spectrum of RhCo-ANAs/CF.

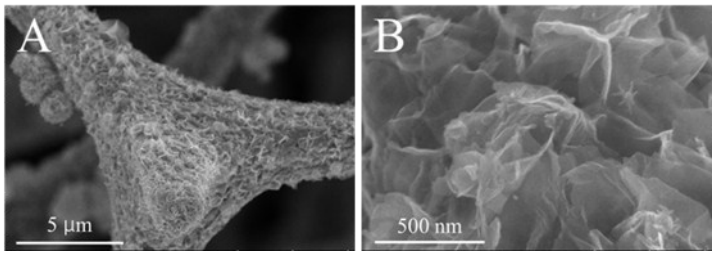

Fig. S13 SEM images of RhCo-ANAs/CF after the stability test (A) SEM images of RhCo-ANAs/CF, (B) magnified SEM images of RhCo-ANAs/CF.

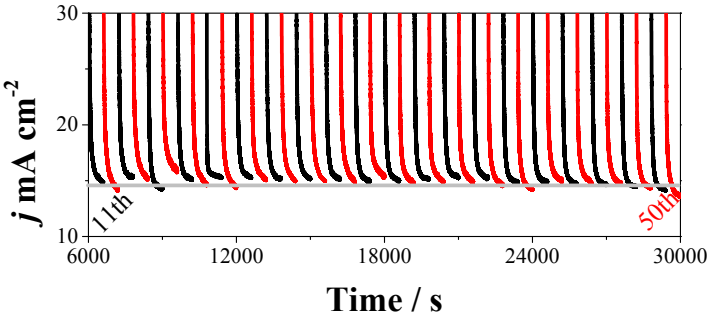

Fig. S14 Chronoamperometric curves of symmetric RhCo-ANAs/CF||RhCo-ANAs/CF electrolyzer in 1.0 M PBS solution in periodically switching cathode and anode mode. Applied voltage: 1.65 V; Switching time interval: 10 min.

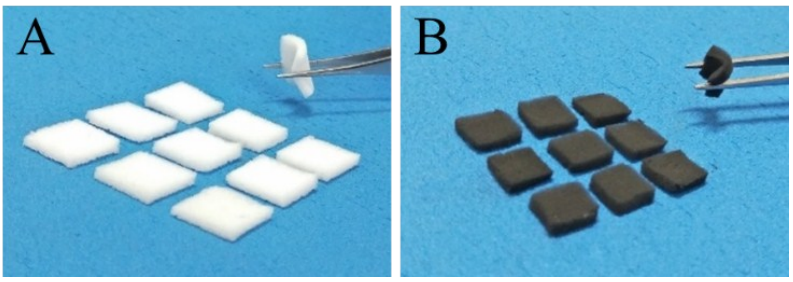

Fig. S15 The photograph of (A) sponge scouring pad and (B) CF with flexible property.