Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

Supplementary Information

Coupling Ag-doping and rich oxygen vacancies in mesoporous NiCoO nanorods supported on nickel foam for highly efficient oxygen evolution

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Detailed caculation process of crystalline size:

Scherrer Equation:

$D=k\lambda/\beta\cos\theta$

where:

k is a dimensionless shape factor; k=0.89 in our article.

λ is the X-ray wavelength; λ=0.15 in our article.

βis the line broadening at half the maximum intensity (FWHM), after subtracting the instrumental line broadening, in radians.

θ is the Bragg angle (in degrees).

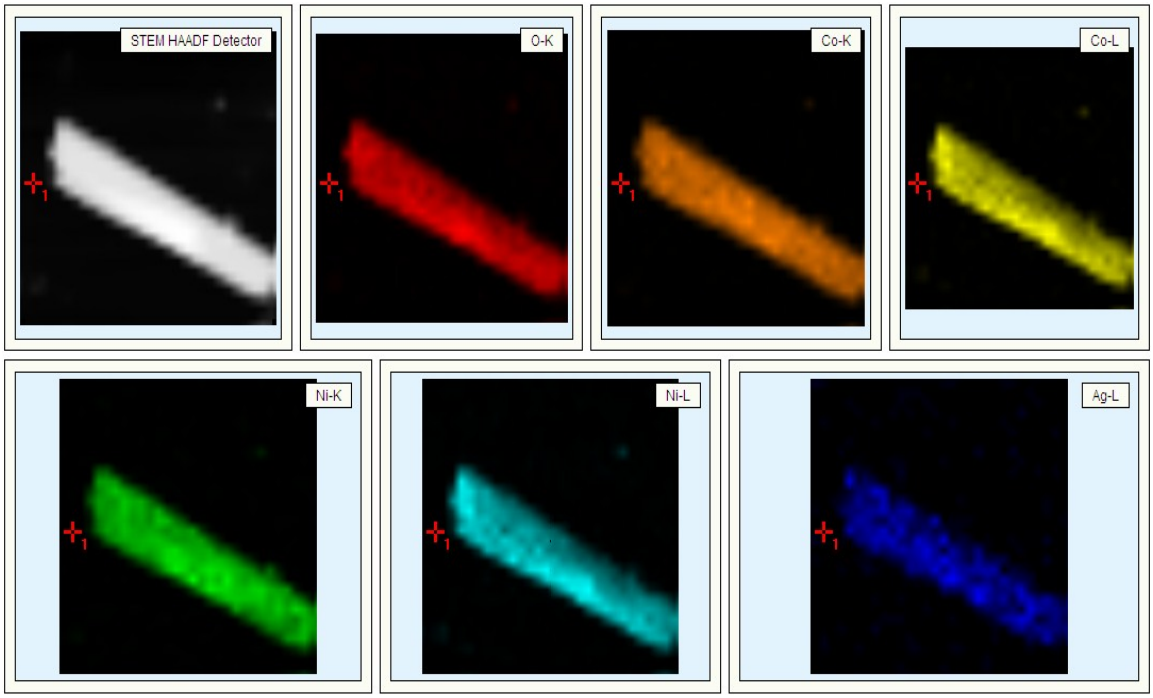

Fig. S1 TEM mappings of Ni-Co@Ag40/NF

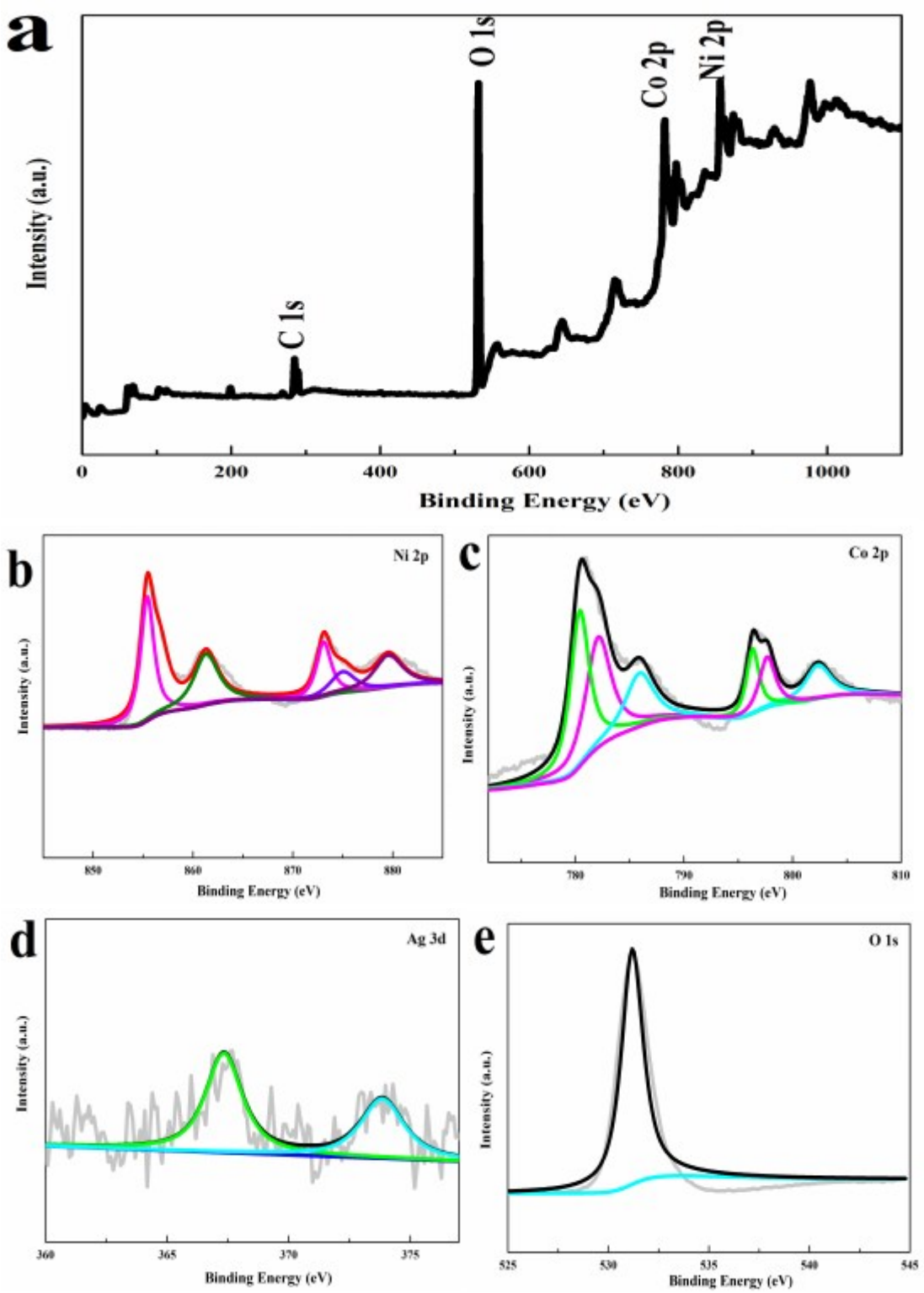

Fig. S2 XPS spectra of Ni-Co@Ag40/NF : (a) survey; (b) Ni 2p; (c) Co 2p; (d) Ag 3d; (e) O 1s.

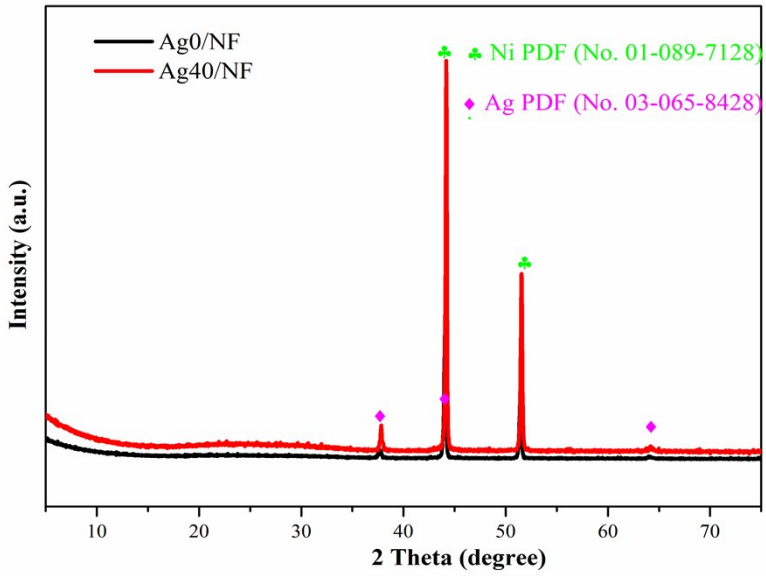

Fig. S3 XRD patterns of Ag0/NF and Ag40/NF.

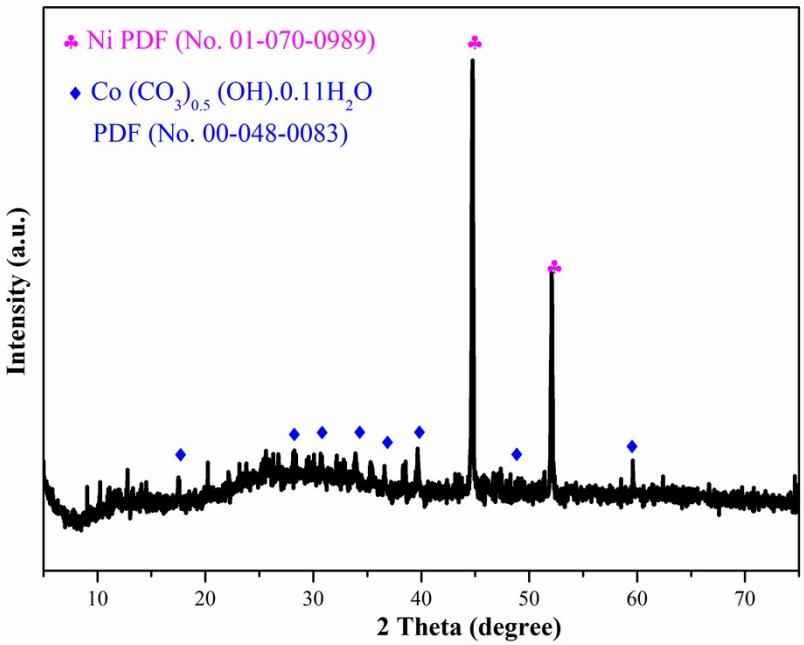

Fig. S4 XRD pattern of Ni-Co@Ag40/NF.

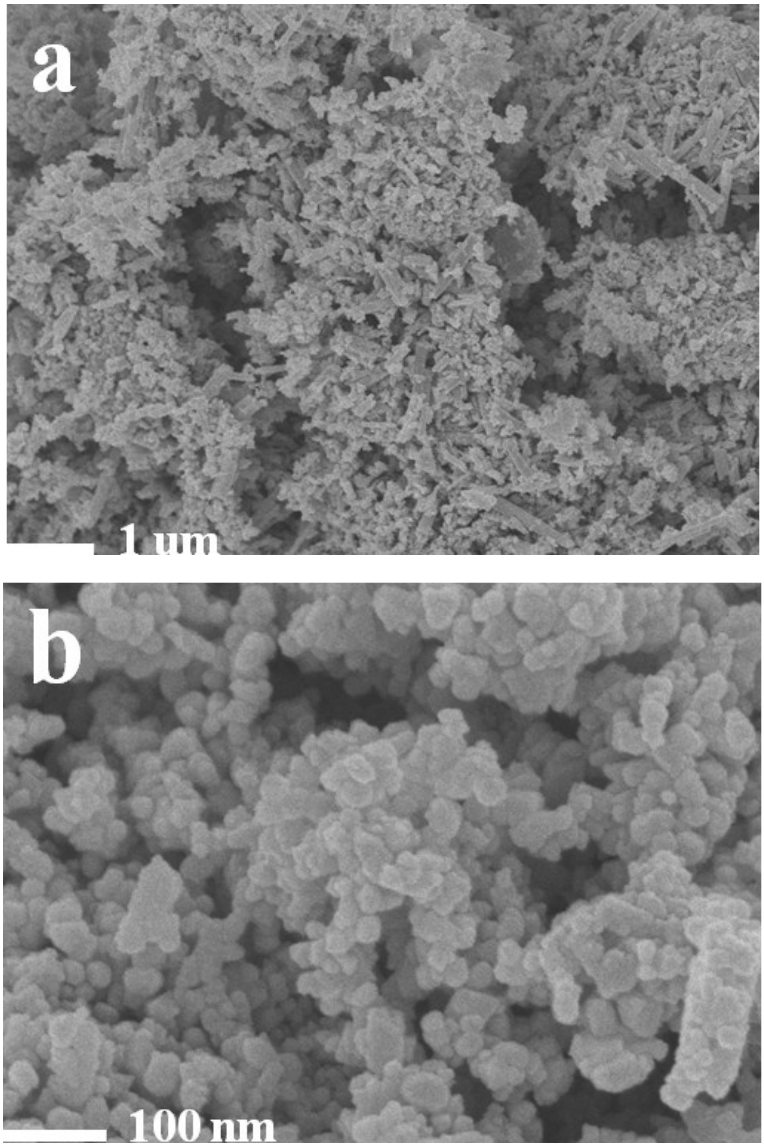

Fig. S5 SEM images of NiCoO/NF-Ar.

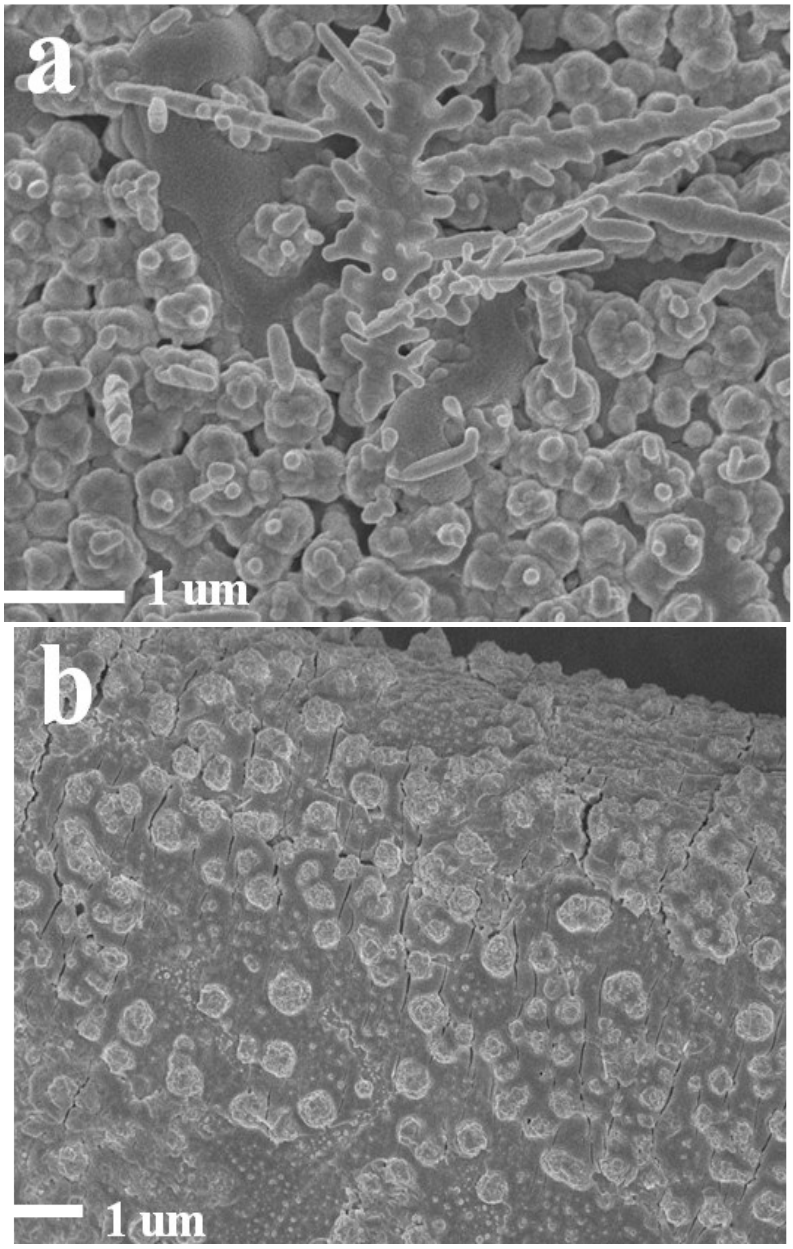

Fig. S6 SEM images of (a) Ag0/NF; (b) Ag40/NF.

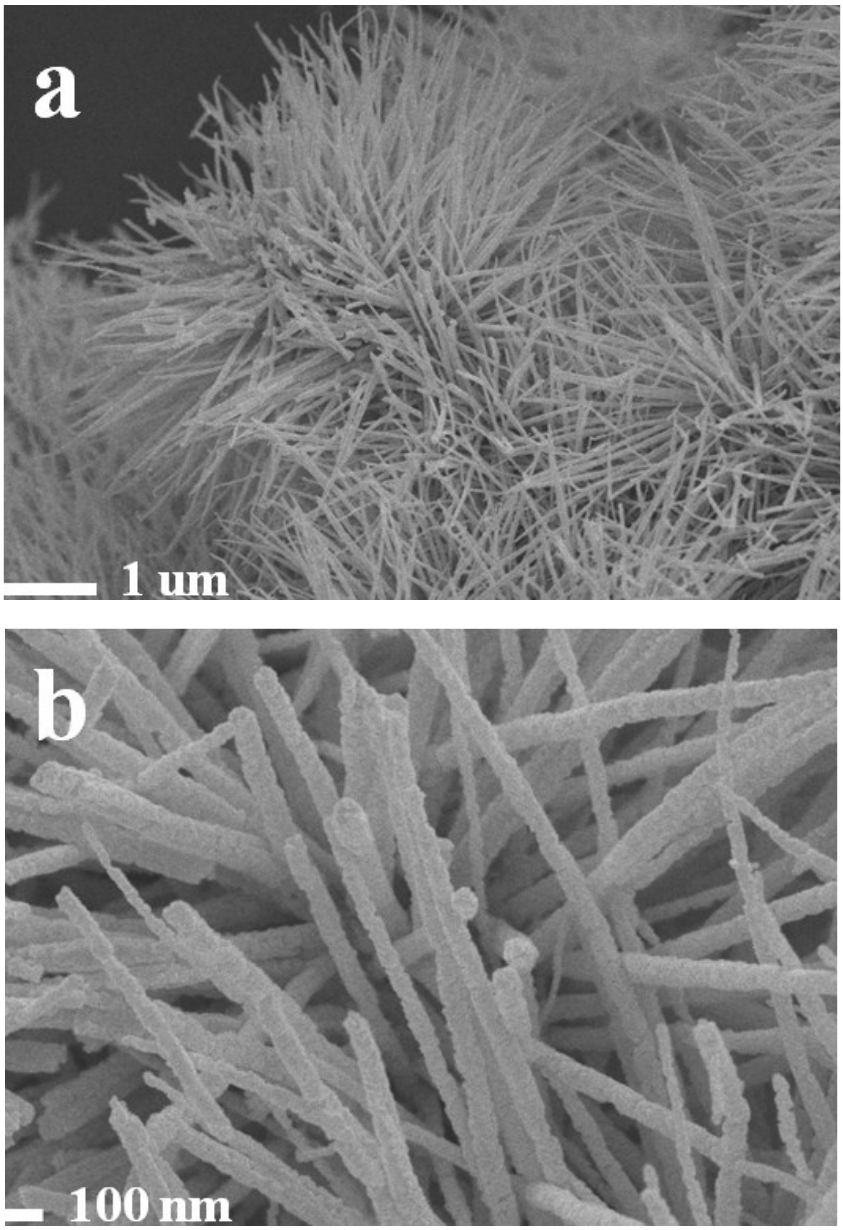

Fig. S7 SEM images of NiCoO@Ag0/NF-Ar

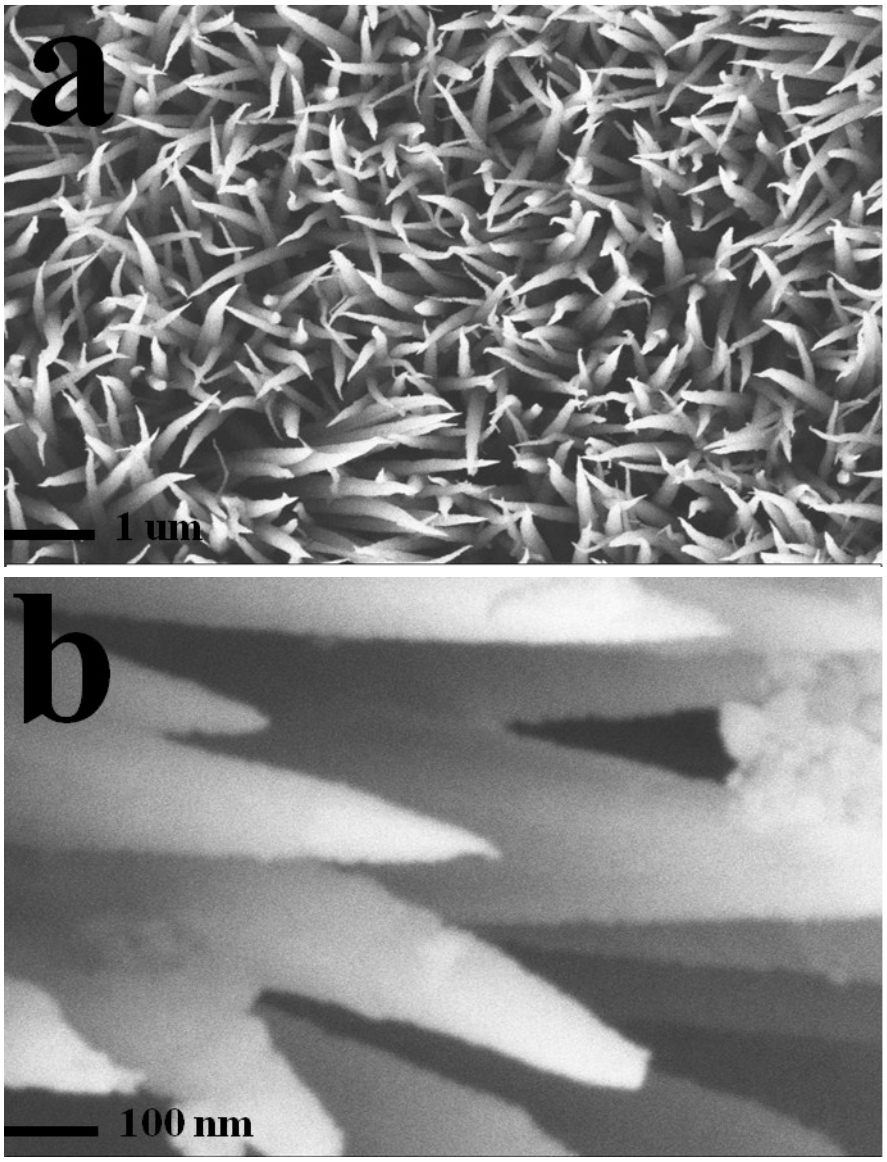

Fig. S8 SEM images of NiCoO@Ag40/NF-Air

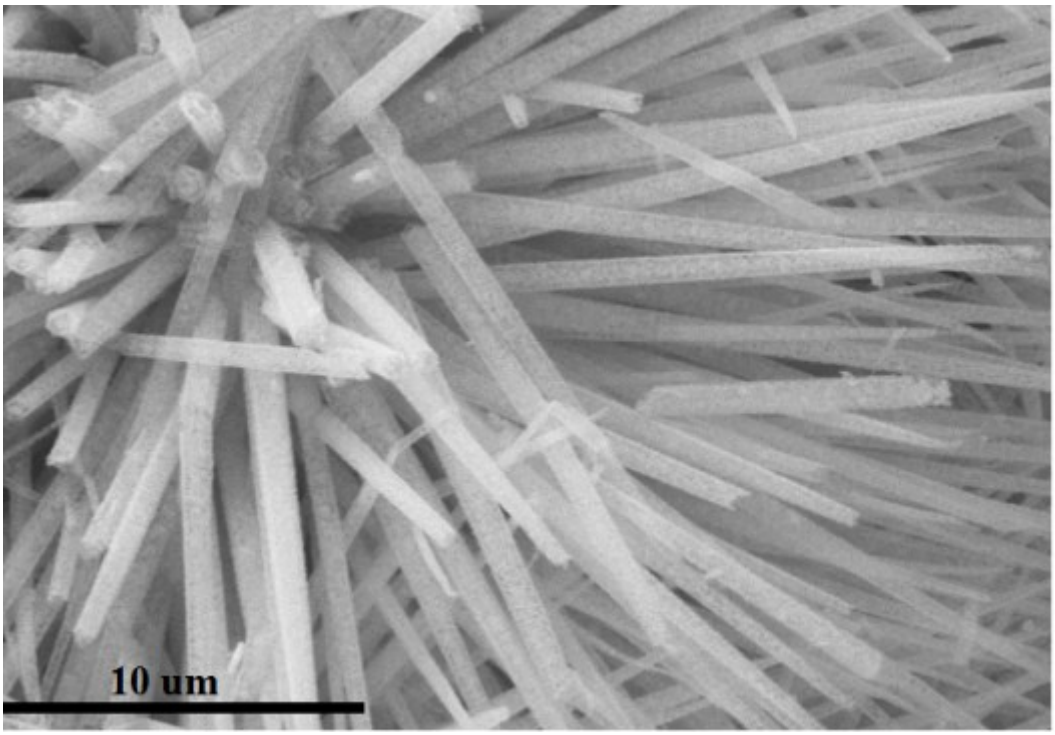

Fig. S9 The corresponding SEM image for performing EDX profile

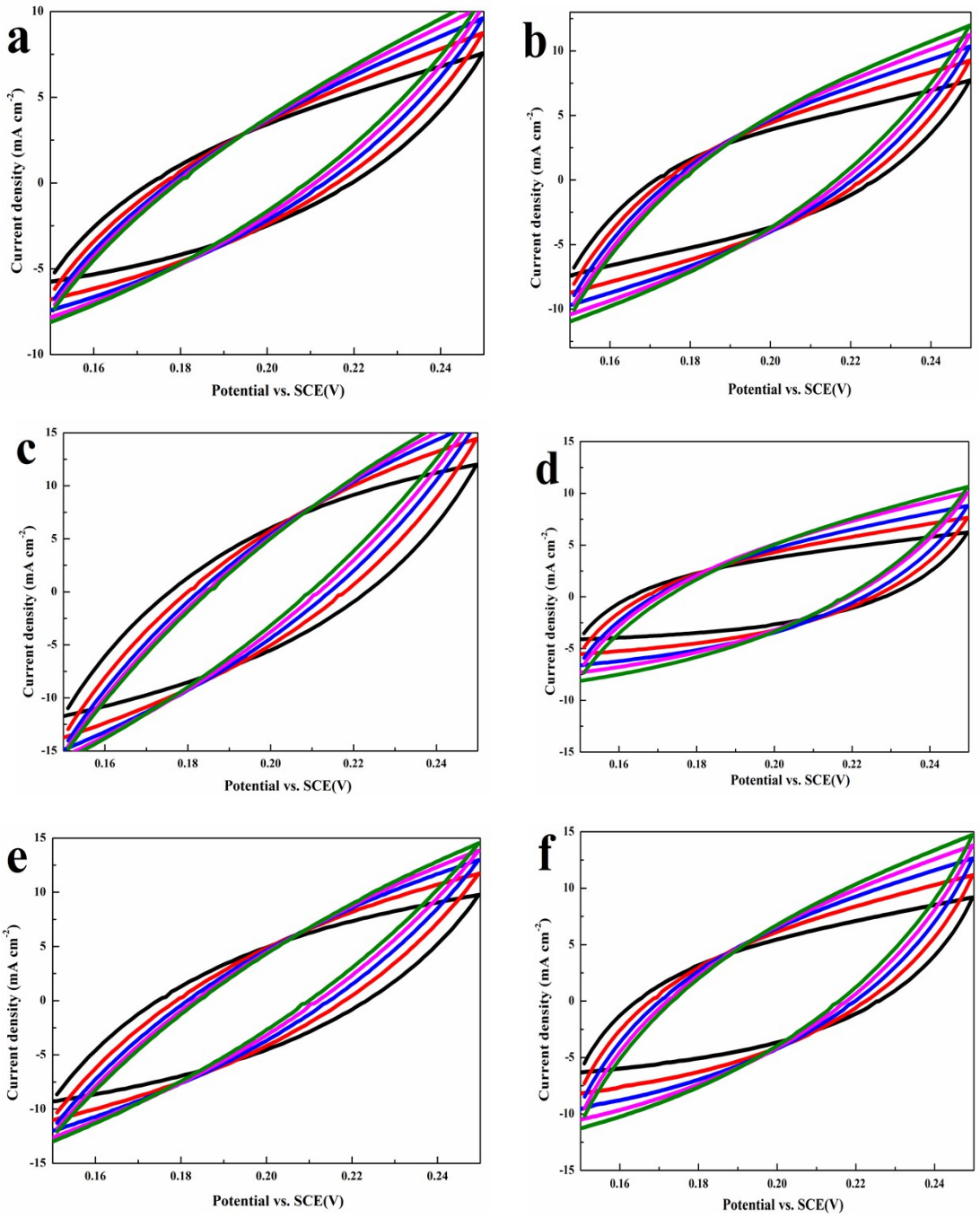

Fig. S10 CVs of the double-layer capacitance measurement for the six different samples in 1 M KOH in the non-Faradaic region of 0.15-0.25 V vs. SCE with different scan rates, varying from 40 mV s^{-1} to 120 mV s^{-1}:

(a) NiCoO/NF; (b) Ni-Co@Ag0/NF; (c) Ni-Co@Ag40/NF; (d) NiCoO@Ag0/NF-Ar; (e) NiCoO@Ag40/NF-Air; (f) NiCoO@Ag40/NF-Ar.

Table S1 Calculation results of crystalline size based on XRD patterns

Crystalline phase	**2-Theta**	**FWHM**	**Crystalline size/nm**
Co based hydroxide hydrate	39.135	0.1224	71
CoO	42.423	0.204	39.8
Co_3O_4	36.963	0.2880	28.2

Table S2 Comparison of the OER activity for several recently reported highly active transition metal oxides electrocatalysts.

Catalyst	***J*** **(mA cm^{-2})**	**Overpotential (mV)**	**Electrolyte**	**Ref.**
NiCoO@Ag40 /NF-Ar	**100**	**350**	**1 M KOH**	**This work**
Reduced Co_3O_4 NW	13.1	420	1 M KOH	S1
Co_3O_4 nanoparticles	10	420	1 M KOH	S2
NiCo layered double hydroxide	10	367	1 M KOH	S3
$Ni_xCo_{3-x}O_4$ nanowire array	10	370	1 M KOH	S4
Ni substituted Co_3O_4 nanowire	10	370	1 M KOH	S5
Cu_2−Cu foams	10	350	1 M KOH	S6

Table S3 Comparison of OER activity data for different electrocatalysts.

Catalyst	**η at *J*=100 mA cm^{-2} [mV]**	**Tafel slope (mV dec^{-1})**	**Cdl (mF cm^{-2})**	**Rct (Ω)**
NiCoO@Ag40/NF-Ar	**350**	**104**	**44**	**0.72**
NiCoO@Ag40/NF-Air	370	147	32	1.28
NiCoO@Ag0/NF-Ar	370	128	25	0.89
Ni-Co@Ag40/NF	400	153	18	1.32
Ni-Co@Ag0/NF	400	148	13	1.49
NiCoO/NF-Ar	410	185	6	3.98

References

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