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Supplementary Materials

High-Density Cobalt Nanoparticles Encapsulated with Nitrogen-Doped Carbon Nanoshells as a Bifunctional Catalyst for Rechargeable Zinc-Air Battery

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Table 1. Comparison of bifunctional oxygen electrode activity data for different catalysts.

Catalysts	Loading ($\mu g \cdot cm^{-2}$)	E_{ORR}/V ($I = -3$ mA·cm^{-2})	E_{OER}/V ($I = 10$ mA·cm^{-2})	ΔE/V ($E_{OER}-E_{ORR}$)	Electrolyte	Source
Pt/C	200	0.82	1.86	1.04	0.1 M KOH	ref. [1]
IrO_2	210	0.29	1.70	1.41	0.1 M KOH	ref. [2]
20% Ir/C	28	0.69	1.61	0.92	0.1 M KOH	ref. [3]
RuO_2	210	0.37	1.64	1.27	0.1 M KOH	ref. [2]
20% Ru/C	28	0.61	1.62	1.01	0.1 M KOH	ref. [3]
Co-N/C 800	240	0.78	1.74	0.96	0.1 M KOH	ref. [4]
Co/N-C-800	250	0.74	1.60	0.86	0.1 M KOH	ref. [5]
Fe@N-C	~311	0.83	1.71	0.88	0.1 M KOH	ref. [6]
Fe/N-CNTs	200	0.81	1.75	0.94	0.1 M KOH	ref. [1]
CNCN-44	200	0.80	1.61	0.81	0.1 M KOH	ref. [7]
(Ni,Co)/CNT	240	0.74	1.60	0.87	0.1 M KOH	ref. [8]
meso-Co_3O_4-35	100	0.61	1.64	1.03	0.1 M KOH	ref. [9]
FeCo@NC-750	800	~0.79	1.49	0.70	0.1 M KOH	ref. [10]
Ni_3Fe/N-C	130	0.78	1.62	0.84	0.1 M KOH	ref. [11]
N-graphene/CNT	~424	0.69	1.65	0.96	0.1 M KOH	ref. [12]
m-NiFe/CNx	200	0.76	1.59	0.83	0.1 M KOH	ref. [13]
$CoFe_2O_4$/rGO	1006	0.73	1.71	0.98	0.1 M KOH	ref. [14]
Co-N/C-800	100	0.84	1.64	0.80	0.1 M KOH	this work

Table 2. Comparison of the performances of rechargeable Zn–air battery for different catalysts.

Catalysts	Loading ($mg \cdot cm^{-2}$)	Per Cycle (min)	Cycle Time (h)	Fluctuation of Discharge Potential (E_{DP}) (V, initial/end)	Fluctuation of Charge Potential (E_{CP}) (V, initial/end)	Current Density ($mA \cdot cm^{-2}$)	Source
NCNT/CoO-NiO-NiCo	0.53	10	17	~ 1.11/1.06	~2.03/1.97	20	ref. [15]
Fe@N-C	2.2	10	16.7	1.25/1.11	1.95/1.97	10	ref. [6]
Co-PDA-C	1	60	500	1.21/1.01	2.15/2.18	2	ref. [16]
$CoMn_2O_4$/N-rGO	-	10	~16.7	~1.09/1.01	~1.77/1.89	20	ref. [17]
Ni_3Fe/N-C sheets	-	240	420	~1.17/1.05	~1.98/2.06	10	ref. [11]
FeCo@NC-750	1	10	20	~1.21/1.14	~1.96/2.00	10	ref. [10]
$NiCo_2O_4$-CNTs	2	10	40	~1.30/1.22	~2.08/2.17	10	ref. [18]
Co-N/C-800	1	60	100	1.21/1.12	1.50/1.51	10	This work

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