Supporting Information for

Edge Dislocation Defects Generation in Co_3O_4 Catalyst: an Efficient Tactic to Improve Oxygen Evolution Catalytic Activity

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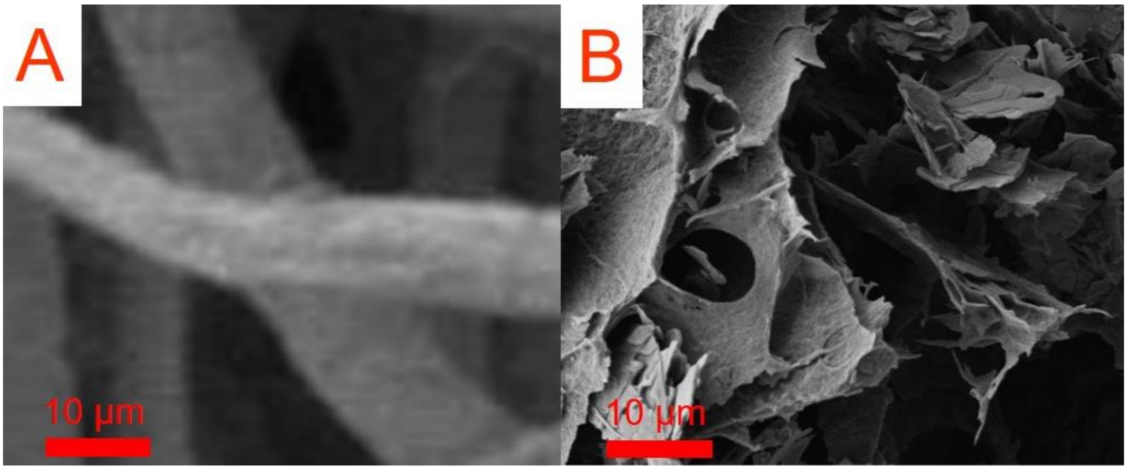

Fig. S1 SEM images of cellulose I (native cotton linter pulp) (A), and cellulose II (regenerated cellulose) (B).

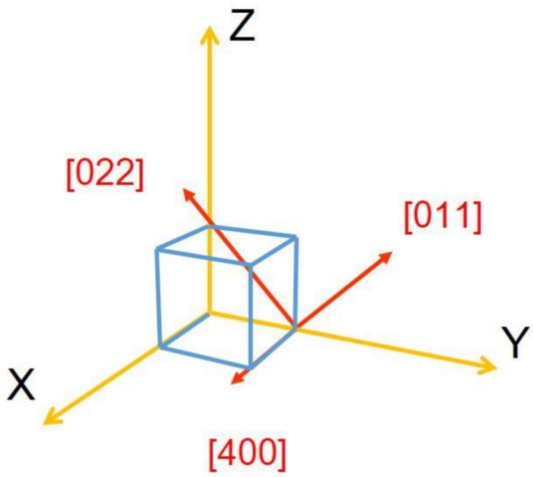

Fig. S2 Structure model from the obtained fcc of DA-Co_3O_4

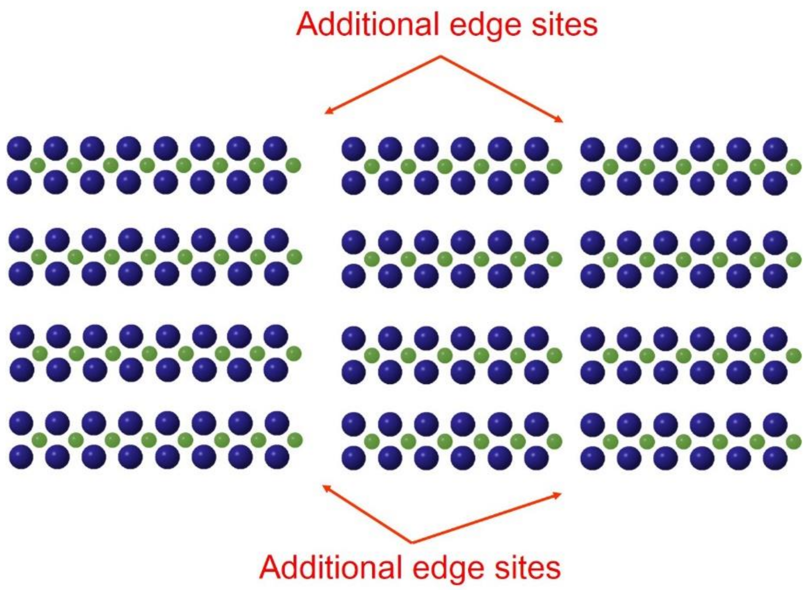

Fig. S3 Atomic reconstruction of Fig. 3G. Additional active edge sites are marked by red arrow.

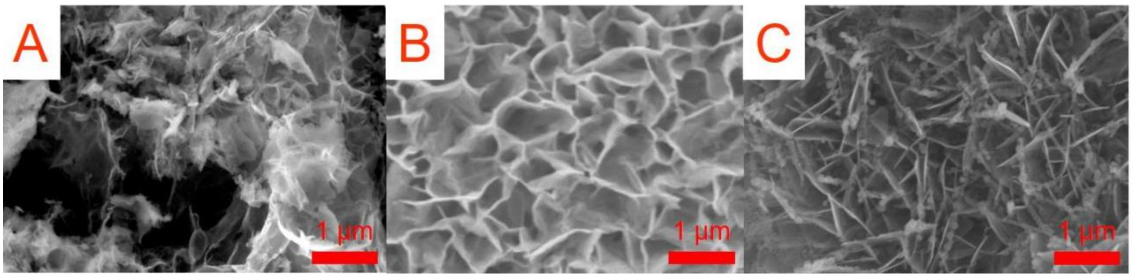

Fig. S4 SEM images of DA-Co_3O_4 (A) ED-Co_3O_4 (B) and HT- Co_3O_4 (C).

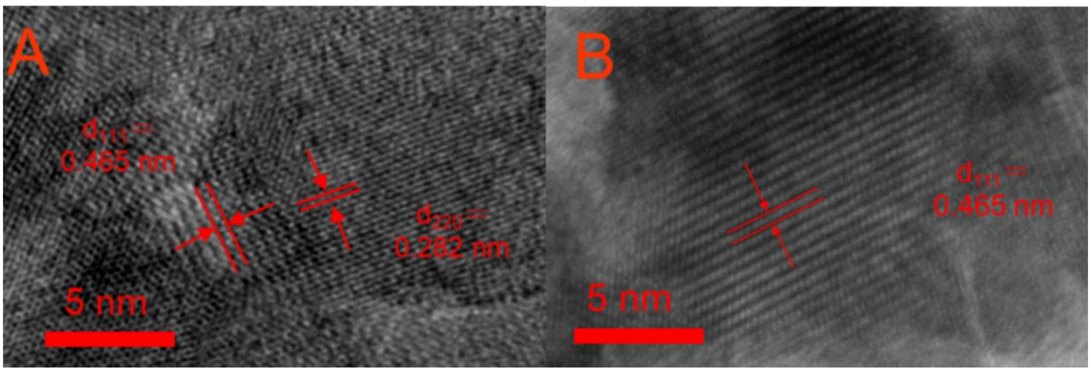

Fig. S5 TEM images of ED-Co_3O_4 (A) and HT- Co_3O_4 (B).

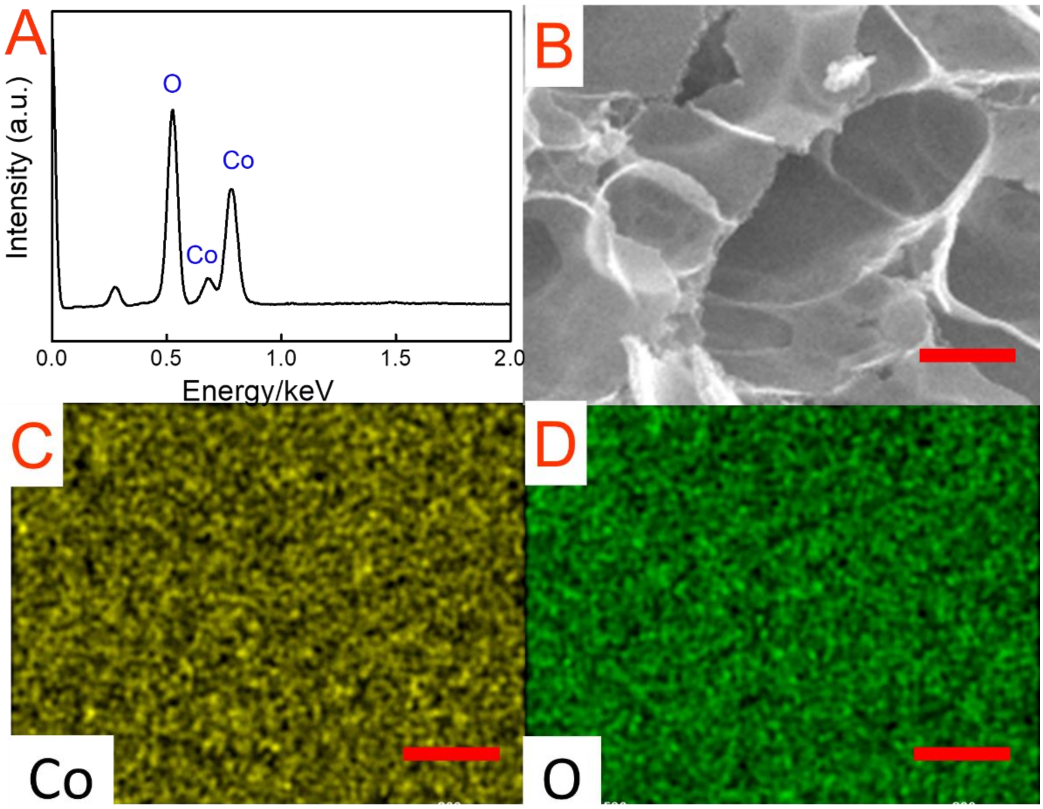

Fig. S6 EDS spectra, elemental mapping and corresponding SEM image of DA- Co_3O_4 nanosheets.

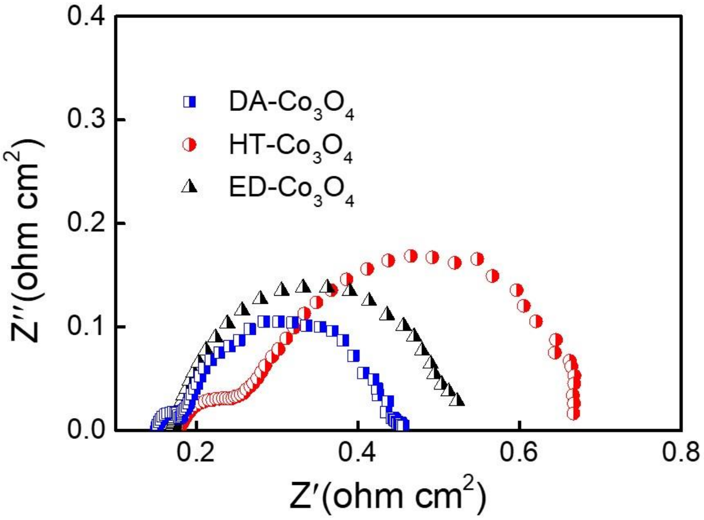

Fig. S7 Nyquist plots of DA-Co_3O_4 (A) ED-Co_3O_4 (B) and HT- Co_3O_4 coated electrodes at a 400 mV overpotential.

The resistances of DA-Co_3O_4, ED-Co_3O_4 and HT- Co_3O_4 coated electrodes for OER process were analyzed by electrochemical impedance spectroscopy technique. As shown in Fig. S7, the resistance in the high frequency region is corresponding to the ohmic resistance R_s. Here, the charge transfer resistance (signed as R_{ct}) was calculated from the arc radius of the Nyquist plot. One can see that the ohmic resistance R_s of DA-Co_3O_4 electrocatalysts coated electrodes is slightly smaller than those of ED-Co_3O_4 and HT- Co_3O_4 electrodes. In addition, the DA-Co_3O_4 coated electrode also shows the lowest charge transfer resistance R_{ct} among these three Co_3O_4 catalysts. These results indicate that the interface of DA-Co_3O_4 electrode had good affinity with the charges and reactants, whose rich defects may promote OH^- diffusion and adsorption, and enhance charge/mass transfer.

Table S1. Comparison of electrocatalytic OER activities of DA-Co_3O_4 coated electrodes with various state-of-the-art OER catalysts.

Catalysts	Electrolyte	η (mV)@ 10 mA cm^{-2}	η (mV)@ 50 mA cm^{-2}	Ref.
DA-Co_3O_4	1M KOH	183	261	This work
Noble metal-based				
IrO_2/C	0.1M KOH	470	N/A	1
IrO_2	0.1M KOH	450	N/A	2
Ir/C	1M KOH	300	N/A	3
LDH-based				
NiFe LDH /CNT	1M KOH	~235	N/A	3
NiFe LDH	1M KOH	300;	N/A	4
NiCo LDH	1M KOH	330;	N/A	4
CoCo LDH	1M KOH	350	N/A	4
NiFe LDH	1M KOH	224	~300	5
NiFe LDH/RGO	1M KOH	245	~290	6
$Ni_{2/3}Fe_{1/3}$-GO	1M KOH	230	N/A	7
NiFe LDH /CQDs	1M KOH	~235	N/A	8
$FeNi_8Co_2$ LDH	1M KOH	220	N/A	9
CoMn LDH	1M KOH	324	N/A	10
CoFe LDH	1M KOH	281	341	26
$Fe_xCo_{1-x}OOH$	1M KOH	266	N/A	27
Transition metal oxides				
Co_3O_4	1M KOH	~270	~330	11
$CoNiO_x$	1M KOH	336	~360	22
$CoFe_2O_4$/C	1M KOH	240	~290	25
$NiCo_2O_4$	1M KOH	340	N/A	12
$Na_{1-x}Ni_yFe_{1-y}O_2$	1M KOH	290		23
$Co_3V_2O_8$	0.1M KOH	350	N/A	13
$CoMoO_4$	1M KOH	312	~390	14
CuO	1 M NaOH	290	~420	20
$CuCo_2O_4$/NrGO	1M KOH	360	~420	15
Other catalysts				
Ni_2P	1M KOH	310	N/A	16
NiFeP	1 M NaOH	219	~340	21
Co_4N/CC	1M KOH	257	~270	17
CoP	1M KOH	360	N/A	18
CoS/Ti	1M KOH	361	~400	19
$CoS_{4.6}O_{0.6}$	1M KOH	290	N/A	24

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