# Support Information

Facile Synthesis of Co_3O_4 with Different Morphologies via Oxidation Kinetic Control and its Application in Hydrogen Peroxide Decomposition

Huihui Chen[a,b], Mei Yang[a,*], Sha Tao[a,b], Mingyue Ren[a,b], Guangwen Chen[a,*]

[a]Dalian National Laboratory for Clean Energy, Dalian Institute of Chemical Physics, Chinese

Academy of Sciences, Dalian 116023, China

[b]Graduate University, Chinese Academy of Sciences, Beijing 100049, China
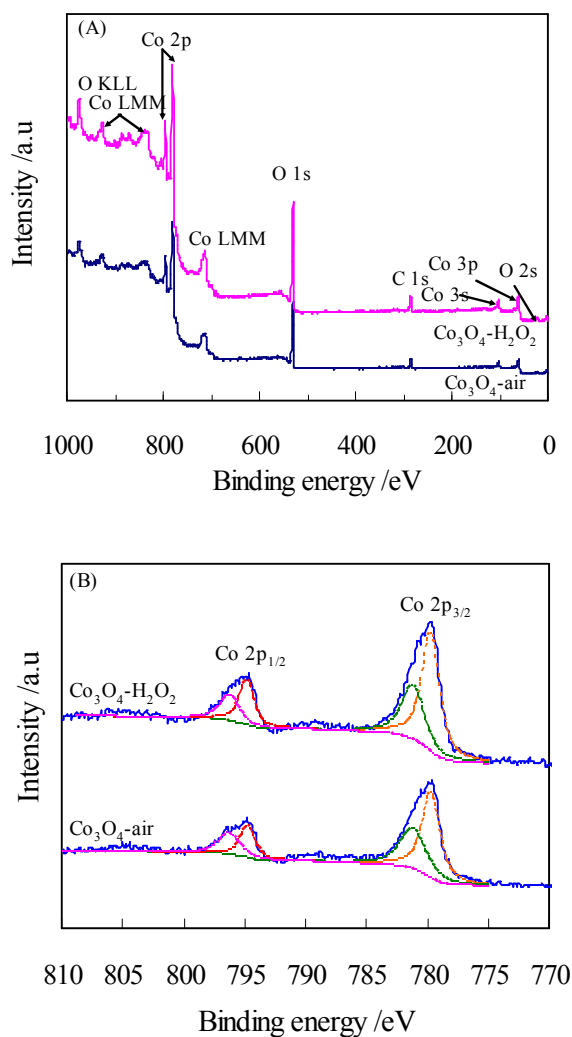
[*] Corresponding author, Tel.: +86-411-8437-9031, Fax.: +86-411-8469-1570

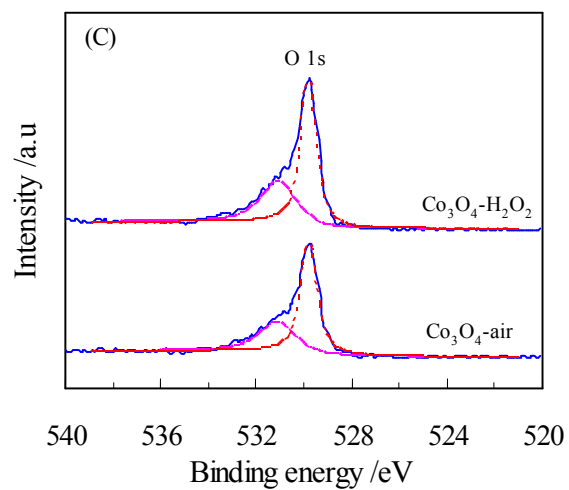*E-mail address*: yangmei@dicp.ac.cn (M. Yang), gwchen@dicp.ac.cn (G.W. Chen).

(C)

O 1s

Intensity /a.u

Co_3O_4-H_2O_2

Co_3O_4-air

540   536   532   528   524   520
Binding energy /eV

Figure S1. (A) XPS survey spectra (B) Co 2p spectra (C) O 1s spectra of the

as-prepared Co_3O_4.

(A)   50 nm

(B)   100 nm

(C)   100 nm

(D)   100 nm
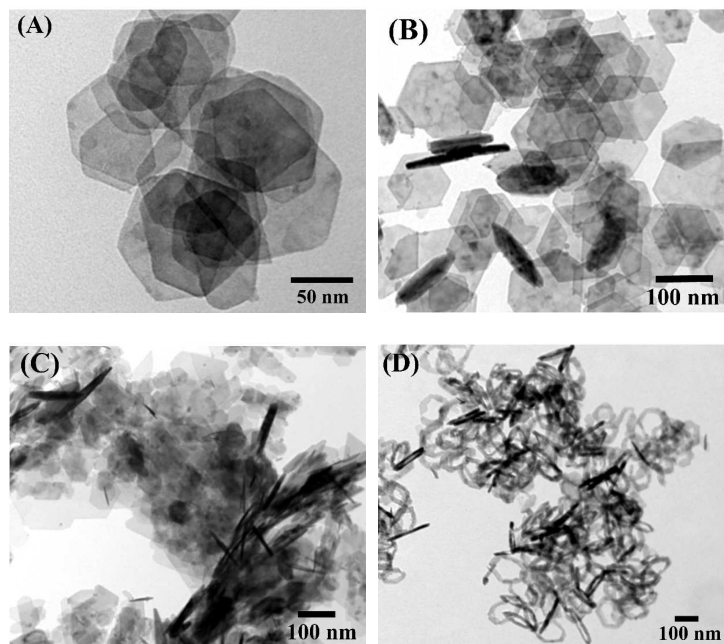
Figure S2. The TEM images of (A) $Co(OH)_2$-NaOH (B) $Co(OH)_2$-NaOH-NaOH (C)

CoOOH-air-NaOH and (D) CoOOH-H_2O_2-NaOH.
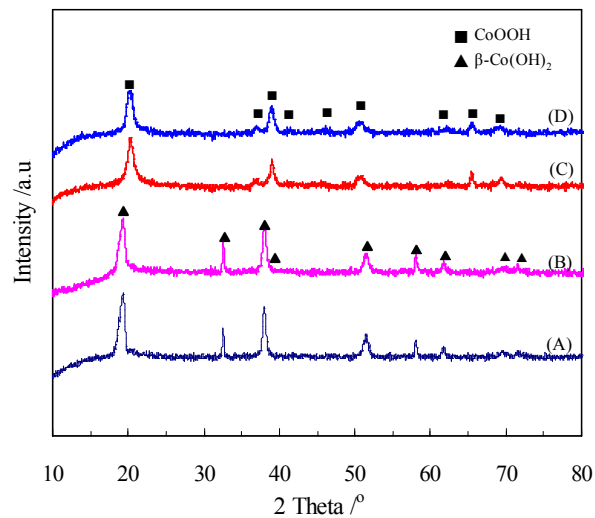
Figure S3. The XRD patterns of (A) Co(OH)$_2$-NaOH (B) Co(OH)$_2$-NaOH-NaOH (C)
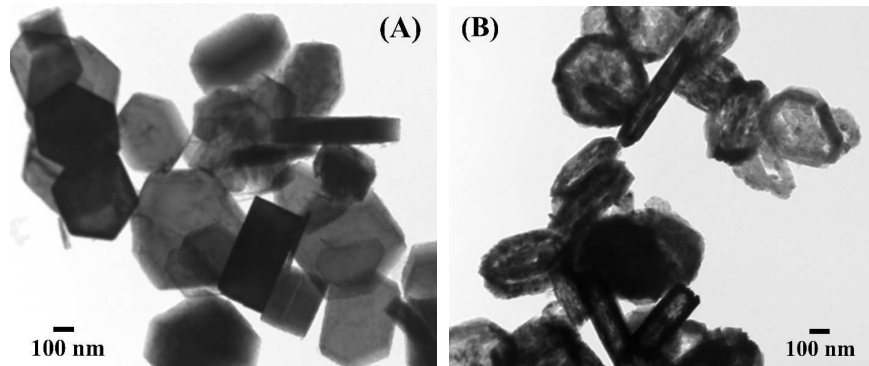
CoOOH-air-NaOH and (D) CoOOH-H$_2$O$_2$-NaOH.

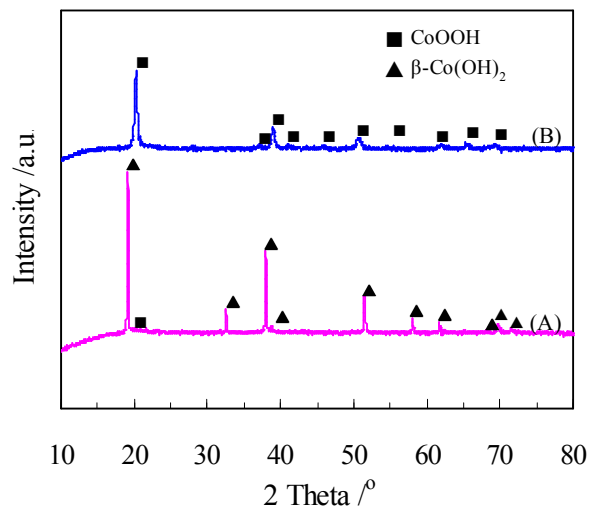Fig. S4. The TEM images of the samples prepared (A) 30 ^{o}C and (B) 70 ^{o}C.

Fig. S5. The XRD patterns of the samples prepared (A) 30 $^{\circ}$C and (B) 70 $^{\circ}$C.

Table S1 Reaction rate constants for H_2O_2 decomposition over various catalysts.

Sample	Reaction condition	S_{BET} m^2/g	k min^{-1}	Reference
LaMnO$_3$	m_{cat}=20 mg, V=50 mL, [H$_2$O$_2$]=0.02 M, [NaOH]=4.9 M, T=20 $^{\circ}$C	25.3	0.30	1
La$_{0.4}$Ca$_{0.6}$MnO$_3$	m_{cat}=20 mg, V=50 mL, [H$_2$O$_2$]=0.02 M, [NaOH]=4.9 M, T=20 $^{\circ}$C	39.2	0.62	1
La$_{0.9}$Sr$_{0.1}$NiO$_3$	m_{cat}=10 mg, V=50 mL, [H$_2$O$_2$]=0.068 M, [KOH]=0.9 M, T=22 $^{\circ}$C	-	0.41	2
La$_{0.9}$Sr$_{0.1}$Ni$_{0.8}$Cr$_{0.2}$O$_3$	m_{cat}=10 mg, V=50 mL, [H$_2$O$_2$]=0.068 M, [KOH]=0.9 M T=22 $^{\circ}$C	-	0.29	2
Co$_3$O$_4$ prepared by combustion method	m_{cat}=50 mg, V=10 mL, [H$_2$O$_2$]=0.7 M, T=35 $^{\circ}$C	83.5	0.072	3
Co$_3$O$_4$ hollow nanospheres	m_{cat}=20 mg, V=25 mL, [H$_2$O$_2$]=0.2 M, T=25 $^{\circ}$C	64.0	0.18	4

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