Electronic supplementary Information for

Construction of hollow structure in $La_{0.9}K_{0.1}CoO_{3-\delta}$ nanofibers via grain size control by Sr substitution with an enhanced catalytic performance for soot removal

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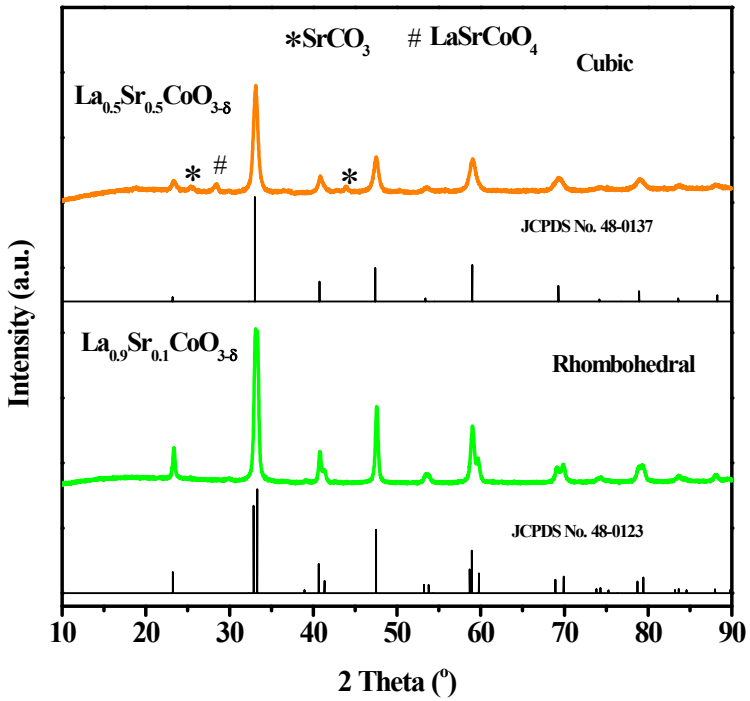

Fig. S1. XRD patterns of $La_{0.9}Sr_{0.1}CoO_{3-\delta}$ and $La_{0.5}Sr_{0.5}CoO_{3-\delta}$ catalysts.

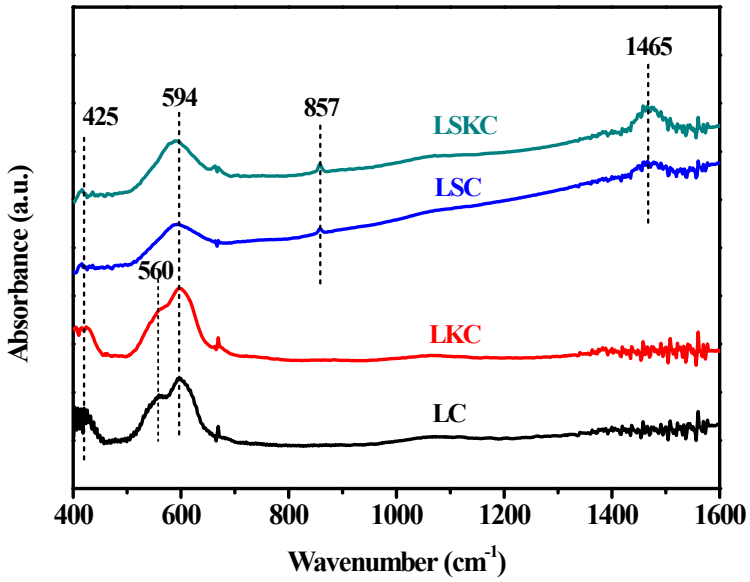

Fig. S2. FT-IR patterns of LC, LKC, LSC and LSKC catalysts.

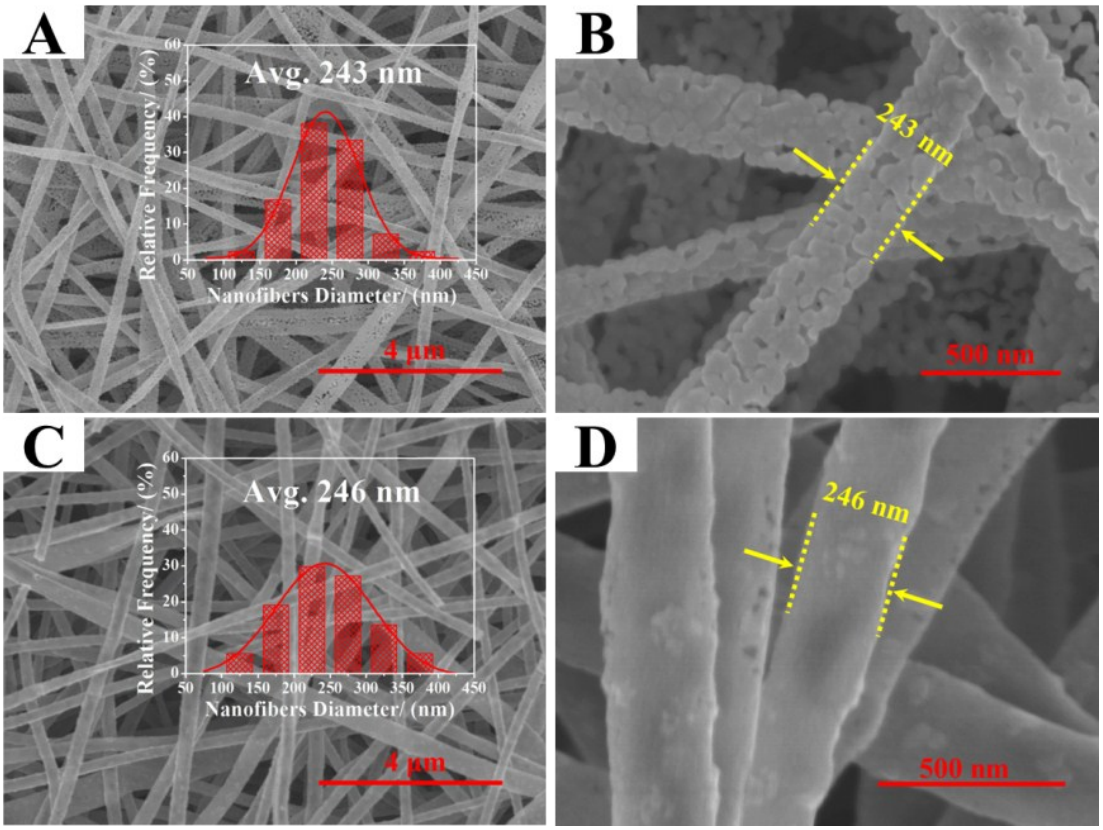

Fig. S3. SEM images of nanotubes: (A) and (B) $La_{0.9}Sr_{0.1}CoO_{3-\delta}$; (C) and (D) $La_{0.5}Sr_{0.5}CoO_{3-\delta}$.

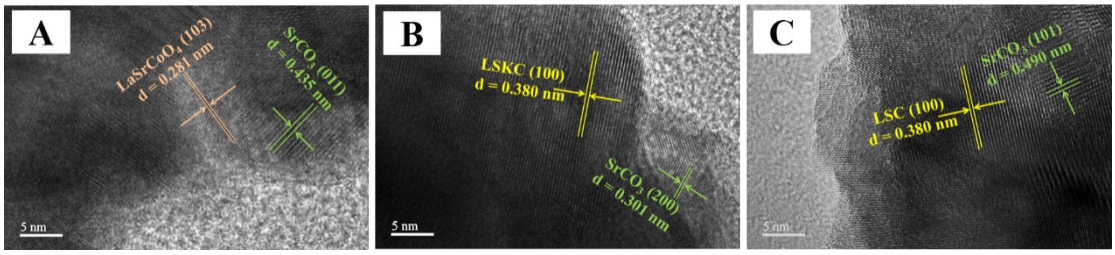

Fig. S4. HRTEM images of (A and B) LSKC and (C) LSC.

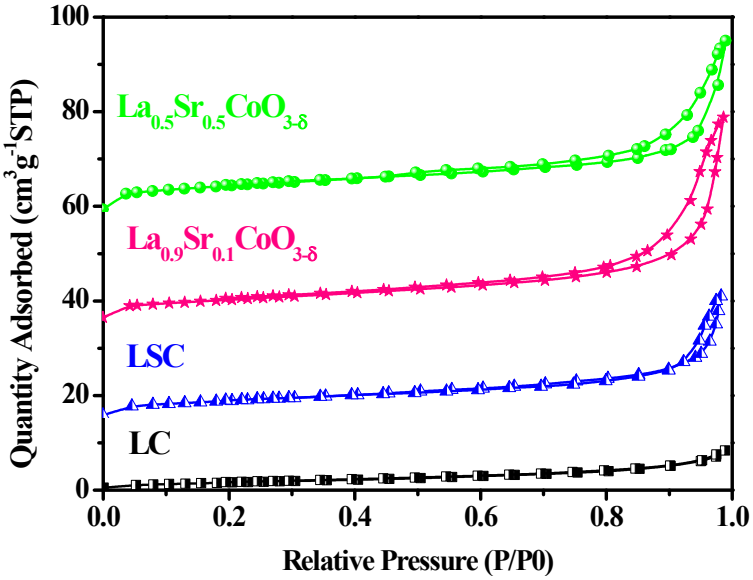

Fig. S5. N_2 adsorption-desorption isotherms of LC, LSC, $La_{0.9}Sr_{0.1}CoO_{3-\delta}$ and $La_{0.5}Sr_{0.5}CoO_{3-\delta}$.

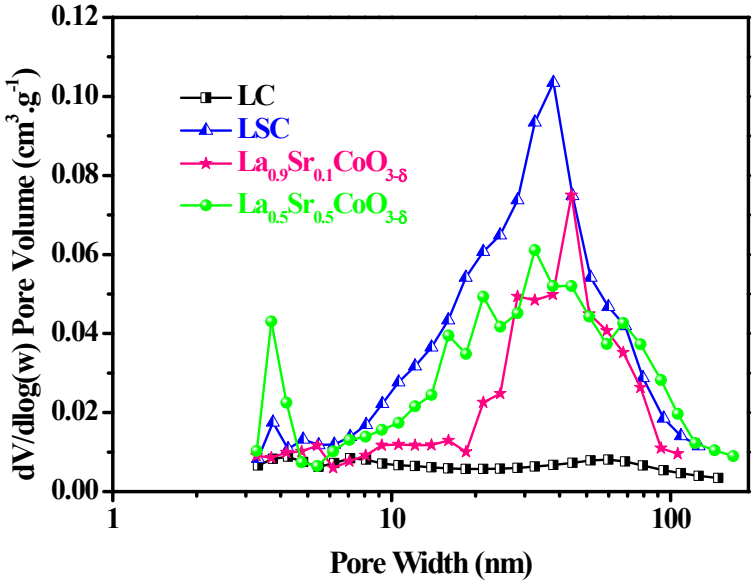

Fig. S6. Pore size distribution of LC, LSC, $La_{0.9}Sr_{0.1}CoO_{3-\delta}$ and $La_{0.5}Sr_{0.5}CoO_{3-\delta}$ obtained from BJH measurements.

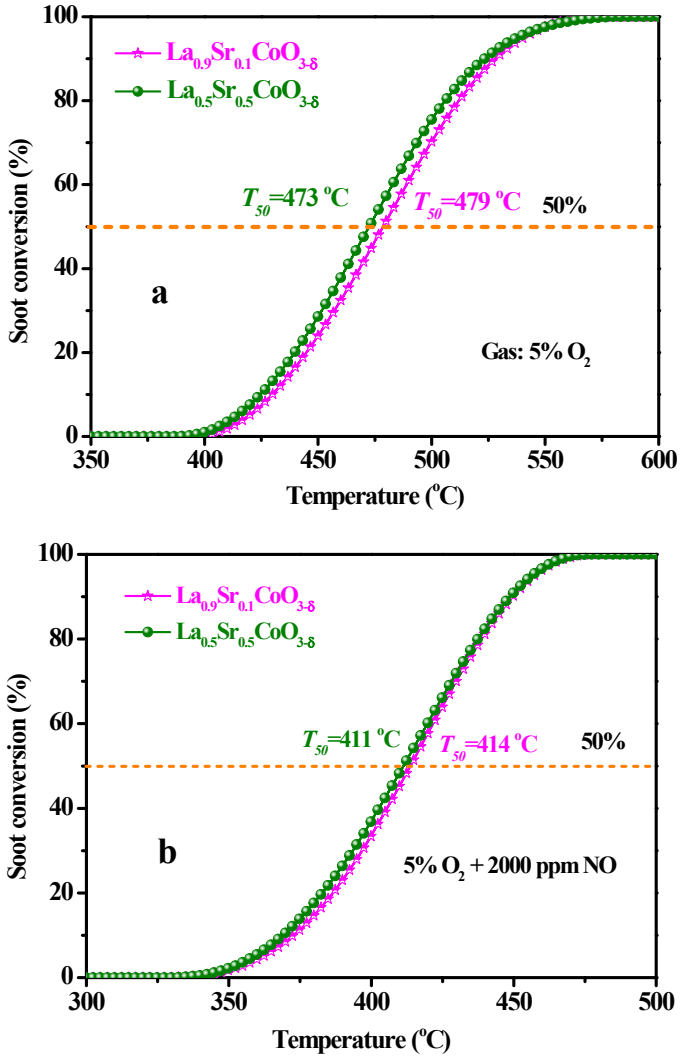

Fig. S7. CO_2 conversion profiles of soot oxidation over $La_{0.9}Sr_{0.1}CoO_{3-\delta}$ and $La_{0.5}Sr_{0.5}CoO_{3-\delta}$ catalysts.

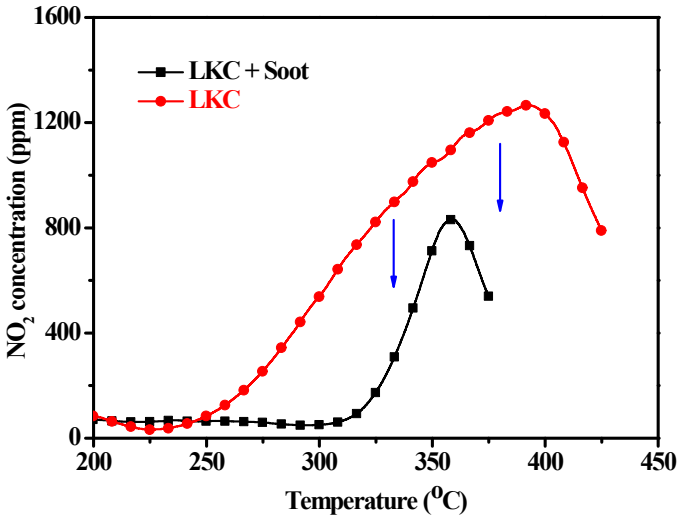

Fig. S8. NO_2 concentration as the temperature rises in NO-TPO.

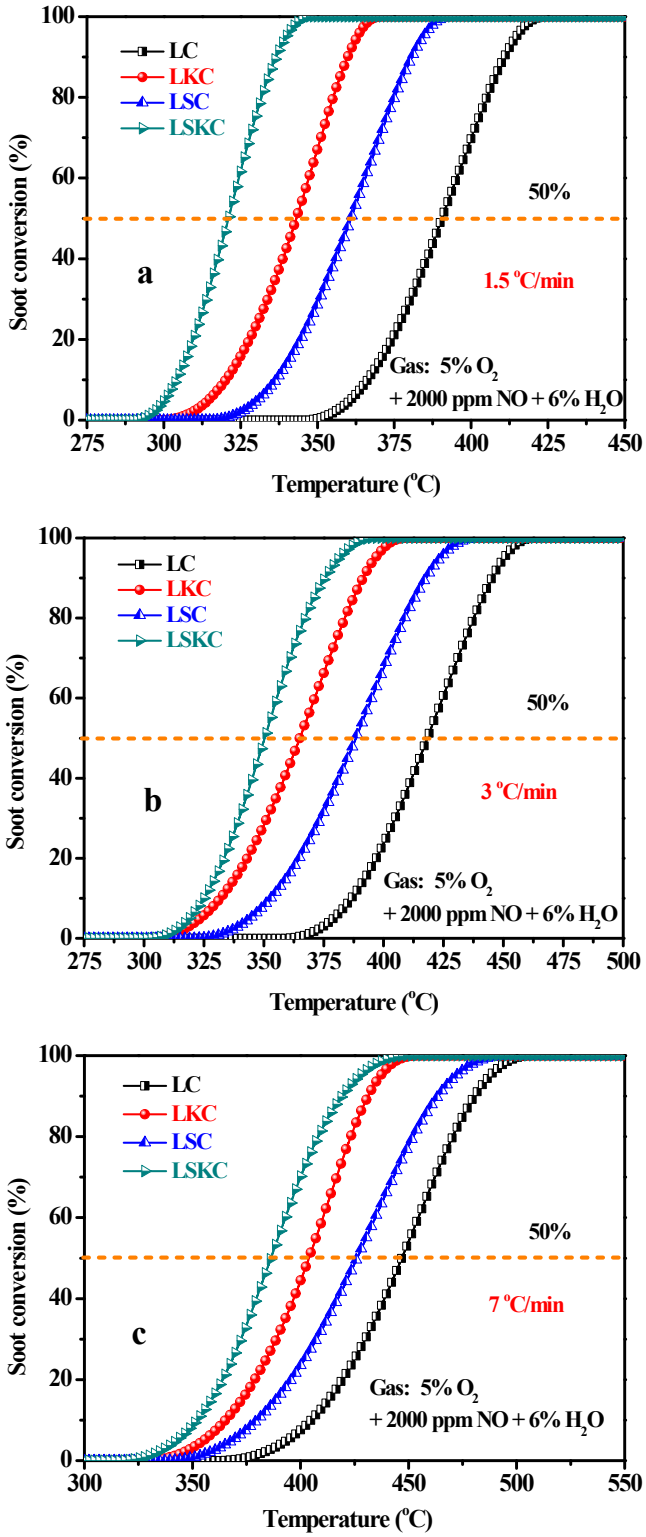

Fig. S9. CO_2 conversion profiles of soot oxidation over LC, LKC, LSC and LSKC catalysts with different heating rate.

Table S1 Unit-cell parameters of LC, LKC, LSC, LSKC, $La_{0.9}Sr_{0.1}CoO_{3-\delta}$ and $La_{0.5}Sr_{0.5}CoO_{3-\delta}$.

Sample	a (Å)	b (Å)	c (Å)	α (deg)	β (deg)	γ (deg)
LC	5.4283	5.4283	13.0316	90.0	90.0	120.0
LKC	5.4344	5.4344	13.0623	90.0	90.0	120.0
LSC	3.8171	3.8171	3.8171	90.0	90.0	90.0
LSKC	3.8207	3.8207	3.8207	90.0	90.0	90.0
$La_{0.9}Sr_{0.1}CoO_{3-\delta}$	5.4056	5.4056	13.1182	90.0	90.0	120.0
$La_{0.5}Sr_{0.5}CoO_{3-\delta}$	3.8220	3.8220	3.8220	90.0	90.0	90.0

Table S2 The average particle size of perovskite phase, the grain growth exponent and the BET surface area of $La_{0.9}Sr_{0.1}CoO_{3-\delta}$ and $La_{0.5}Sr_{0.5}CoO_{3-\delta}$.

Catalyst	$La_{0.9}Sr_{0.1}CoO_{3-\delta}$	$La_{0.5}Sr_{0.5}CoO_{3-\delta}$
D (nm)	20.1	15.3
m	15.5	17.0
BET ($m^2 \cdot g^{-1}$)	13.0	20.1