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Sulfur Dioxide-tolerant Strontium Chromate for the Catalytic Oxidation of Diesel Particulate Matter

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Table S1. 2θ value and the corresponding reflection plane for $SrCrO_4$ and $SrCO_3$

2θ value in (°) and reflection plane of $SrCrO_4$ phase						2θ value in (°) and reflection plane of $SrCO_3$ phase	
300 °C	500 °C	700 °C	800 °C	900 °C	Reflection plane	300 °C	Reflection plane
23.94	24.08	23.93	23.99	24.03	020	25.22	111
25.83	25.91	25.81	25.79	25.80	200	31.65	012
27.35	27.42	27.32	27.30	27.34	120	36.23	112
28.53	28.55	28.45	28.48	28.5	210	41.47	220
29.77	29.75	29.73	29.70	29.70	012	44.20	221
29.89	29.85	29.82	29.79	29.80	$\bar{1}12$		
-	-	31.80	31.86	31.87	121		
33.08	33.11	33	32.99	33.03	$\bar{2}02$		
-	35.0	34.98	34.93	34.96	112		
35.29	35.32	35.22	35.23	35.24	$\bar{2}12$		
38.48	38.44	38.36	38.36	38.35	$\bar{3}01$		
39.11	39.06	38.99	38.99	39.0	031		
40.28	40.27	40.23	40.2	40.2	$\bar{1}31$		
-	42.33	42.27	42.26	42.3	131		
43.88	43.88	43.80	43.80	43.85	212		
46.18	46.18	46.09	46.09	46.1	$\bar{1}32$		
46.5	46.56	46.46	46.44	46.46	320		
-	48.22	48.18	48.16	48.21	023		

49.54	49.45	49.36	49.36	49.4	$\bar{3}_{22}$		
49.91	49.84	49.75	49.75	49.8	132		
51.20	51.18	51.09	51.09	51.15	140		
-	53.18	52.99	52.98	53	400		
54.28	54.16	54.04	54.05	54.08	$\bar{4}_{02}$		
-	54.67	54.5	54.5	54.5	410		
-	55.9	55.1	55.1	55.1	321		
-	56.38	55.79	55.8	55.8	$\bar{4}_{12}$		
57.32	57.21	57.09	57.14	57.17	$\bar{3}_{32}$		
-	57.72	57.61	57.65	57.7	$\bar{2}_{14}$		
-	60.21	60.09	60.09	60.18	$\bar{1}_{24}$		
-	64.73	64.51	64.55	64.56	340		
66.40	66.56	66.44	66.42	66.42	332		
-	67.16	67.10	67.06	67.07	$\bar{3}_{42}$		

Table S2. PM oxidation activity

Catalyst	T_{10}	T_{50}	T_{90}
Printex-V	556	626	681
SCO-fresh	431	470	490
Pt-SCO (5 wt.%)	414	460	485
Pt-Al_2O_3 (5 wt.%)	537	587	607

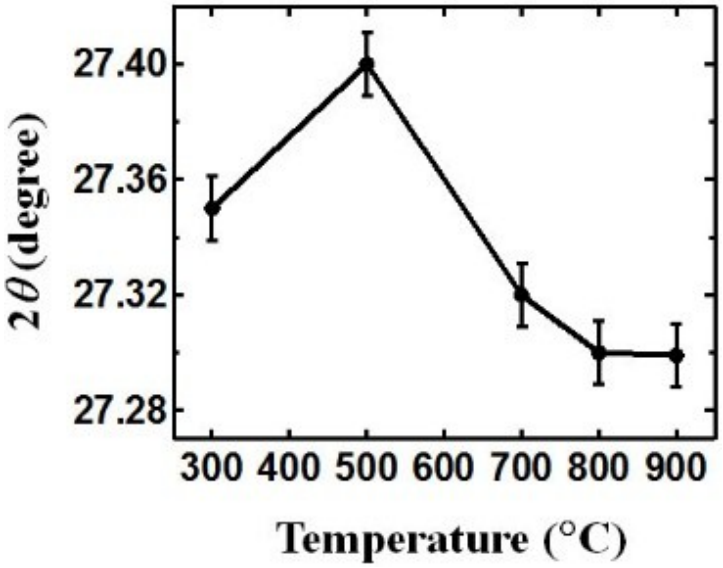

Figure S1. The dependence of 2θ of $SrCrO_4$ as a function of temperature.

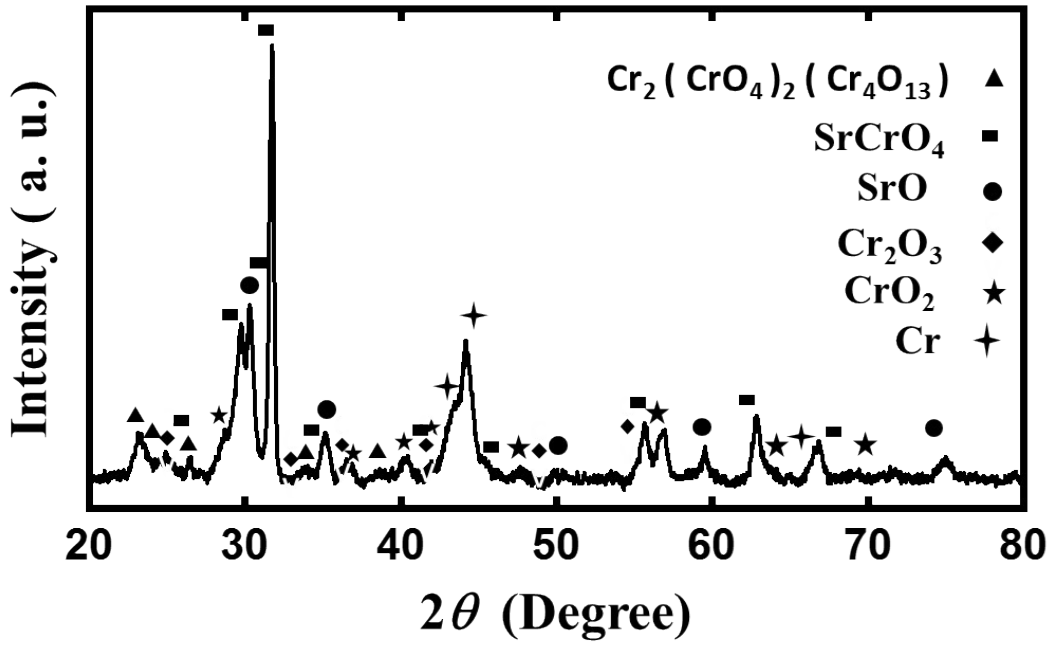

Figure S2 . *p*XRD profile after H_2-temperature programmed reduction of $SrCrO_4$.

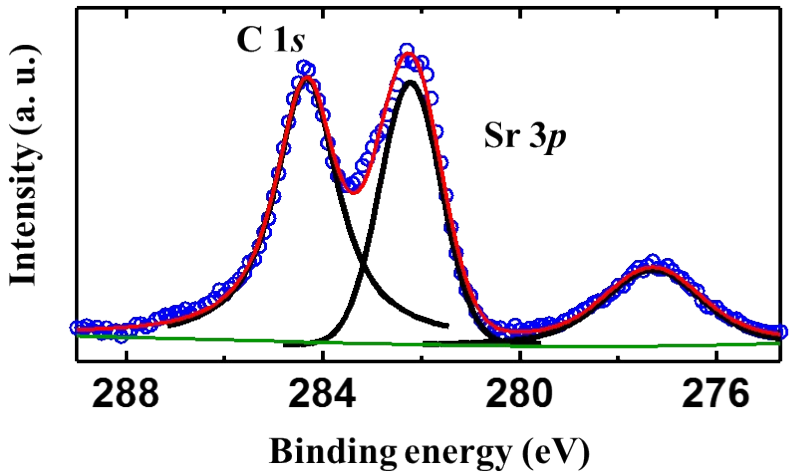

Figure S3. X-ray photoelectron spectral profiles of $SrCrO_4$ in the region of C 1*s* and Sr 3*p*.

Figure S3 shows the characteristics photoemission peaks for C 1*s* at 284.4 eV. In addition, the characteristics peaks for Sr $3p_{3/2}$ and Sr $3p_{1/2}$ were observed at 282.3 and 277.3 eV respectively, which also corresponds to Sr^{2+}. (N. A. Fadil, G. Saravanan, G.V. Ramesh, F. Matsumoto, H. Yoshikawa, S. Ueda, T. Tanabe, T. Hara, S. Ishihara, H. Murakami, K. Ariga , and H. Abe, Chem .Commun ., 2014, **50**, 6451.)

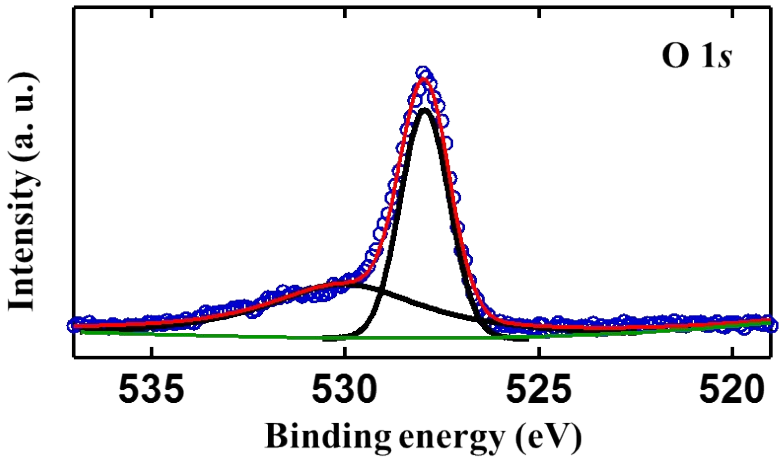

Figure S4. X-ray photoelectron spectral profiles of $SrCrO_4$ in the region of O 1*s*.

Pt- is one of the crucial components for the commercial exhaust catalysts. Therefore, Pt was dispersed on the surface of SCO to compare its catalytic activity with the reference Pt/Al_2O_3 catalyst (Pt loading = 5 wt.%). Pt/ SCO was synthesized by a wet-impregnation method.

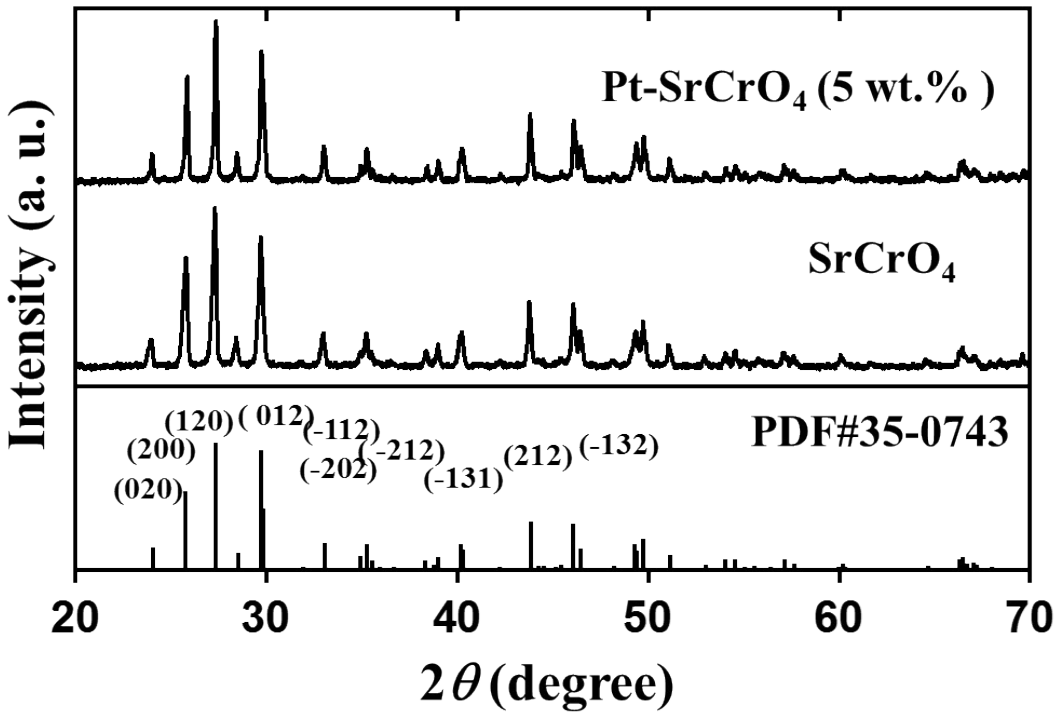

Figure S5. *p*XRD profile of $Pt/SrCrO_4$ (Pt loading = 5 wt.%). pXRD profile of $SrCrO_4$ is shown for reference purpose.

Figure S5 shows the *p*XRD profile of the product synthesized after calcination of stoichiometric Pt precursor coated SCO catalyst in the flow of 5%-H_2/N_2 gas at 200 °C for 5 h. The *p*XRD profile for Pt/SCO was virtually same as compared to the fresh XRD profile of SCO. The characteristic peaks for Pt were not obtained due to likely the lower concentration of Pt.

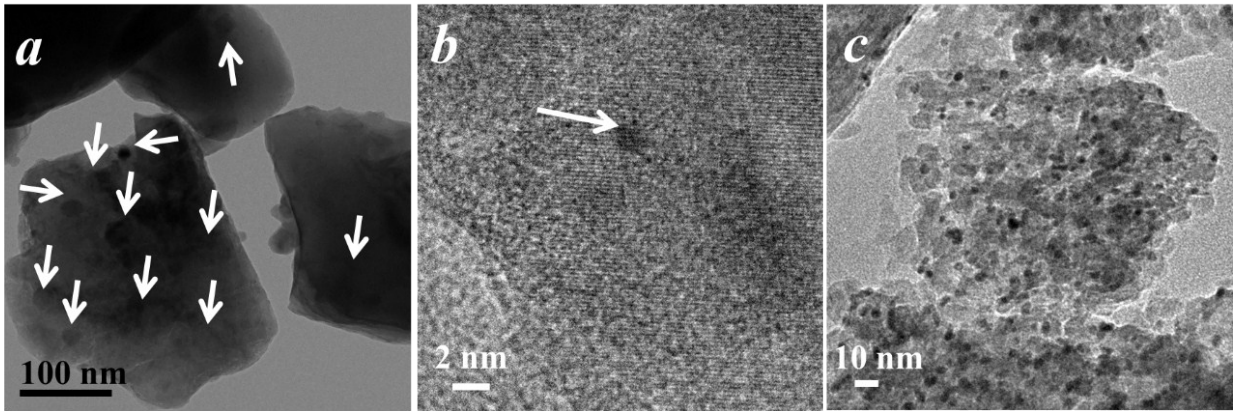

Figure S6. TEM (a) and HR-TEM image (b) of Pt/$SrCrO_4$ (Pt loading = 5 wt.%), TEM image of the commercial Pt/Al_2O_3 (Pt loading = 5 wt.%).

TEM observation of Pt/SCO has been performed to examine the morphology, size and shape of the catalyst (Figure S6 *a, b*). The size of the Pt particles was in the range between 10 to 25 nm. The particles are spherical in shape. The particle size of the commercial Pt/Al_2O_3 (5 wt.%) was observed between 2 and 5 nm (Figure S6 *c*) which is lower than that of Pt/SCO.