

# Synthesis of Porous Cobalt Oxide and Its Performance for H<sub>2</sub>S Removal at Room Temperature

*Jian Wang,<sup>†</sup> Chao Yang,<sup>†</sup> Ying-Rui Zhao,<sup>†</sup> Hui-Ling Fan,<sup>\*,†</sup> Zhong-De Wang,<sup>†</sup>*

*Ju Shangguan<sup>†</sup> and Jie Mi<sup>†</sup>*

<sup>†</sup>State Key Laboratory of Coal Science and Technology, Co-founded by Shanxi Province and the Ministry of Science and Technology, Institute for Chemical Engineering of Coal, Taiyuan University of Technology, West Yingze Street Number 79, Taiyuan 030024, People's Republic of China

\*Corresponding Author. Tel.: 0086-351-6010530; fax: 0086-351-6010530; E-mail:

[fanhuiling@tyut.edu.cn](mailto:fanhuiling@tyut.edu.cn)

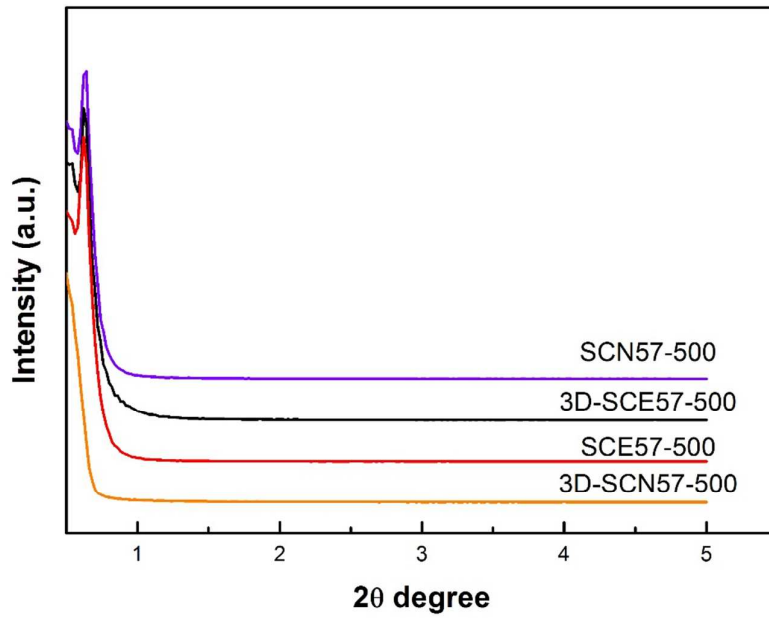


Figure S1. Low angle PXRD patterns of cobalt oxide-silica composites

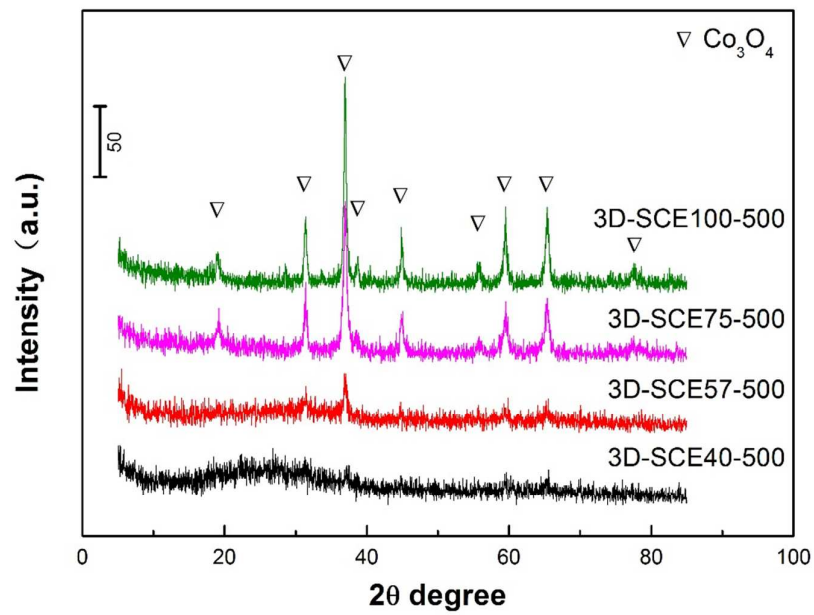
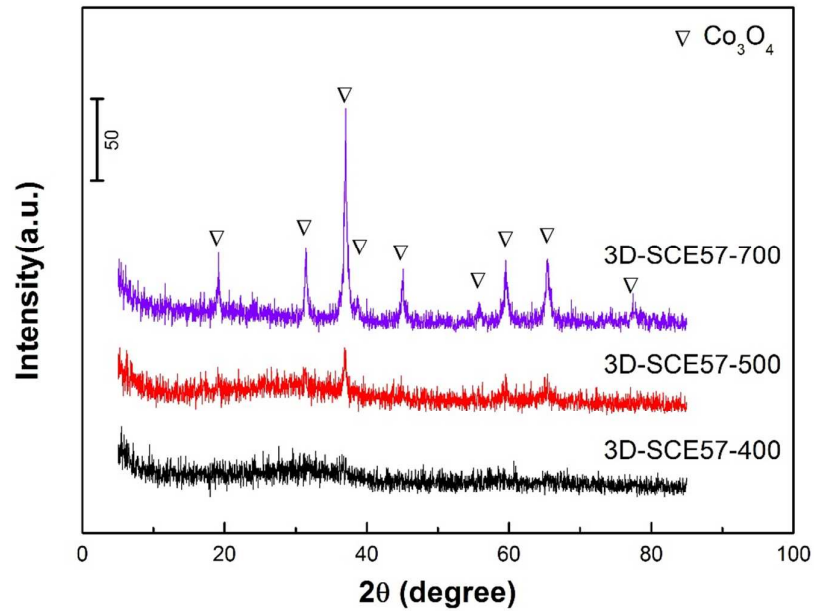


Figure S2. XRD patterns for 3D-SCE<sub>x</sub>-500 samples with different Co<sub>3</sub>O<sub>4</sub> content



**Figure S3.** XRD patterns for 3D-SCE57-y with different calcination temperature

**Table S1.** Structure parameters of cobalt oxide–silica composites

Sample	$S_{BET}$ (m <sup>2</sup> /g)	$V_t$ (cm <sup>3</sup> /g)	$W_{BJH}$ (nm)
SCN57-500	314.5	0.296	3.506
SCE57-500	137.2	0.168	3.723
3D-SCN57-500	159.5	0.319	1.999
3D-SCE57-500	275.4	0.490	3.523
3D-SCE100-500	20.1	0.145	2.471
3D-SCE57-500S	104.3	0.242	3.474
3D-SCN57-500S	55.2	0.154	1.935

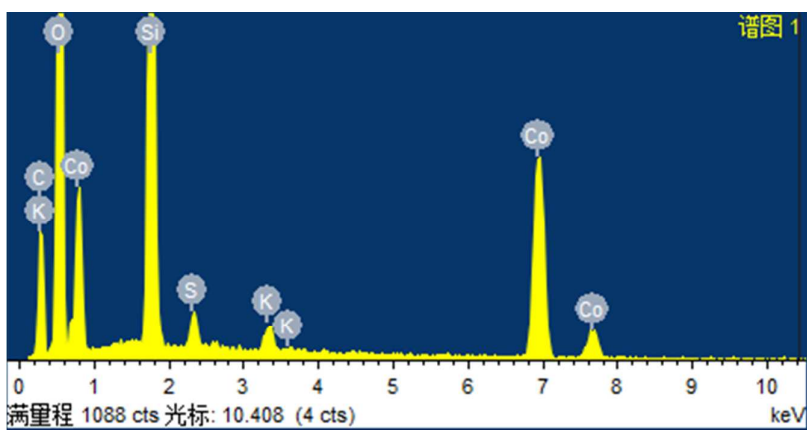


Figure S4. EDX analysis of 3D-SCE57-400

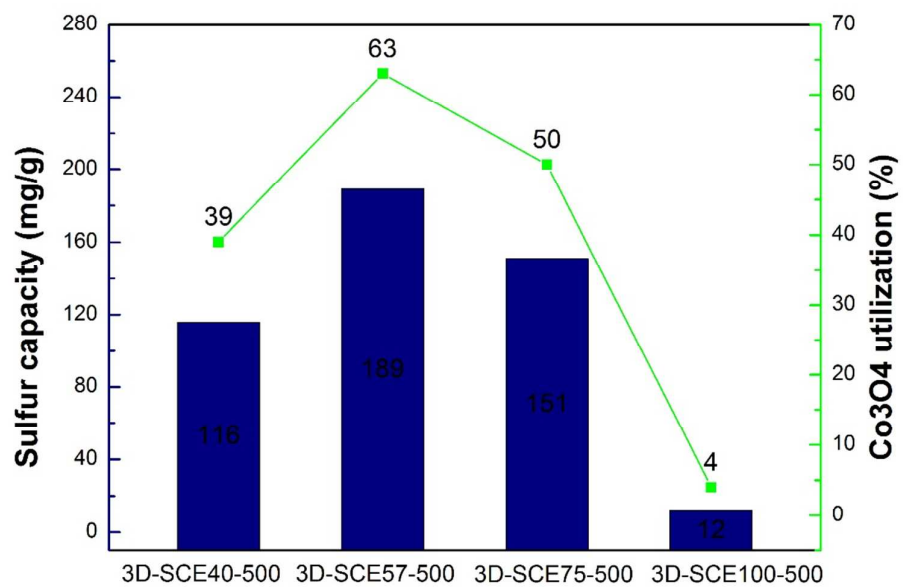


Figure S5. Breakthrough sulfur capacities and  $\text{Co}_3\text{O}_4$  utilization levels of 3D-SCE $x$ -500 samples