

Electronic Supporting Information

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Experimental

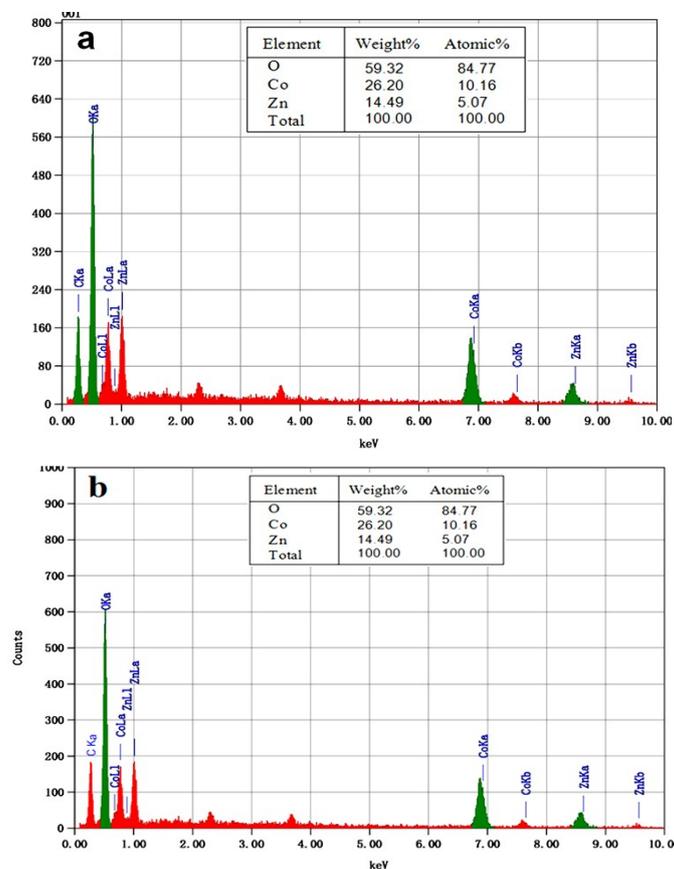
Synthesis of ZCO lamellar cubes

In order to prepare cubic ZnCo_2O_4 , 1mmol $\text{Zn}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ and 2mmol $\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ were completely dissolved in ethylene glycol (50ml) to form a transparent solution. Brief, 10mmol NH_4F and some Na_2SO_4 were dissolved completely with ethanol (20ml), added to solution above. After ultrasonic and stirred treatments, the final solution was transferred to a Teflon-lined stainless autoclave, which was heated 180°C for 8h in air flow electric oven. Next, the product was washed by distilled water and ethanol several times prior to being dried at 60°C for 10h. Finally, the final sample was collected after the calcination process at 650°C for the gas sensing test further.

Table. s1 Comparisons of BET data of three samples and the response and response/recovery times of three sample-based sensors toward 100 ppm ethanol

Samples	Materials	Structures	Surface area/ $\text{m}^2 \cdot \text{g}^{-1}$	$T_{\text{Res}} \sim T_{\text{Rec}}/\text{s}$	Response
S1	ZnCo_2O_4	microsphere	77.3	5.5~14.3	19.3
S2	ZnCo_2O_4	lamellar cubic	24.5	7.6~19.7	9.8
S3	Co_3O_4	microsphere	42.1	33.7~16.4	8.9
S4	ZnCo_2O_4	nanoparticles	21.3	8.9~13.1	7.1

T_{Res} , response time; T_{Rec} , recovery time



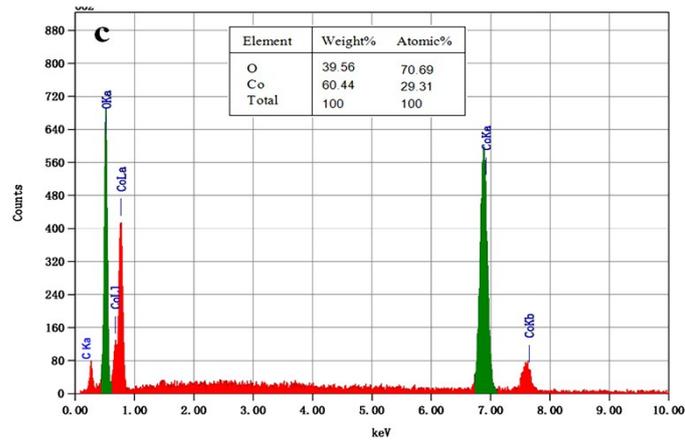


Fig.s1 EDX analysis spectrums of S1, S2, S3 (a, b, c, respectively).

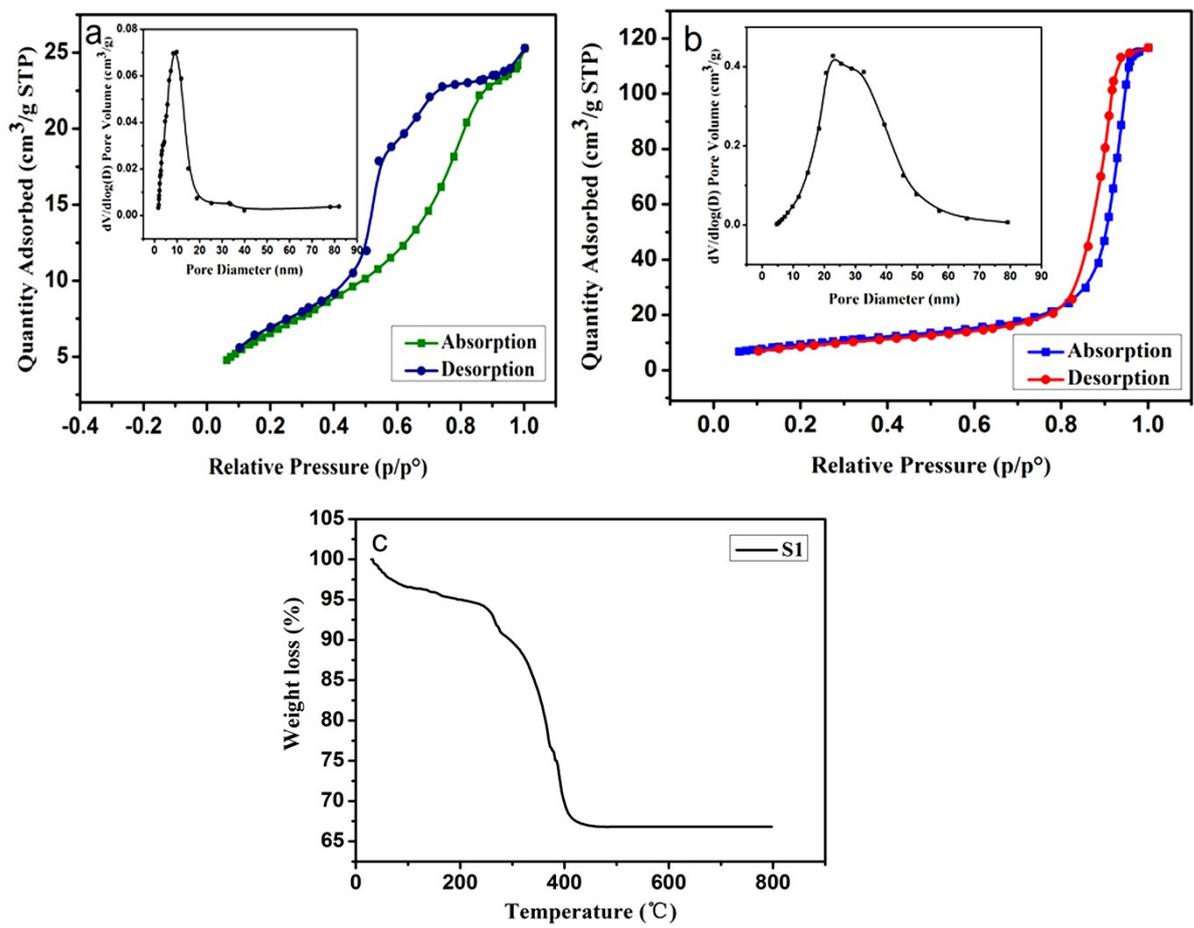


Fig.s2 N₂ adsorption-desorption isotherms and corresponding BJH pore-size distribution plots (inset) of S2, S3 (shown in a, b, respectively), and TGA curve of S1(c).

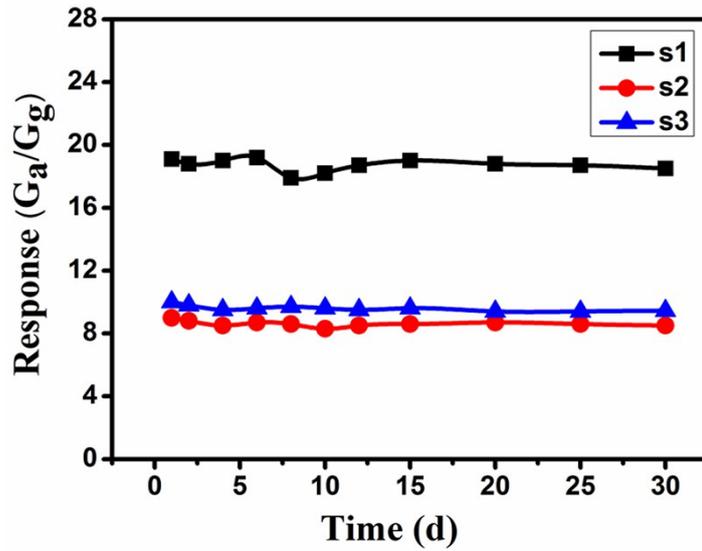


Fig.s3 Long-term stability of sensor based S1, S2, and S3 to 100ppm ethanol at 175°C.

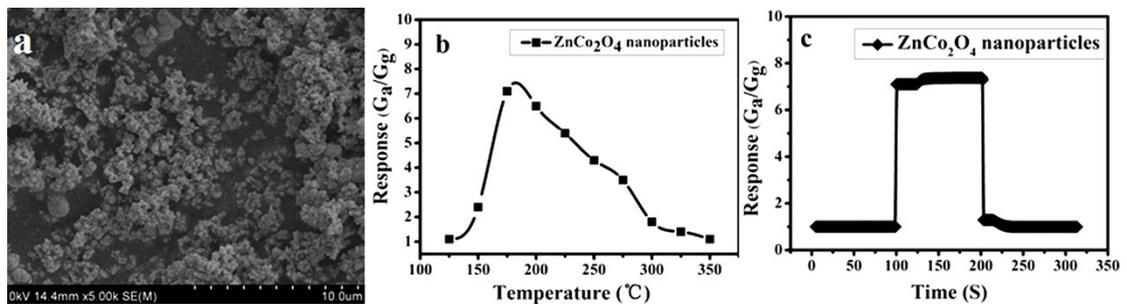


Fig.s4 SEM image of S4 (a), response of sensor based on ZnCo₂O₄ nanoparticles to 100ppm ethanol (b) and response/recovery times (c).