## Supporting information

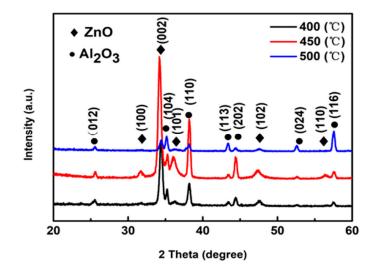


Fig. S1 XRD patterns of the ZnO film annealed at 400 °C, 450 °C and 500 °C, respectively.

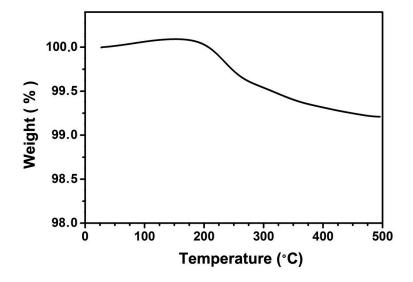


Fig. S2 TGA of the ZnO film from room temperature to 500 °C

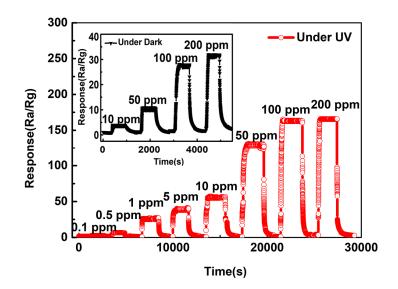
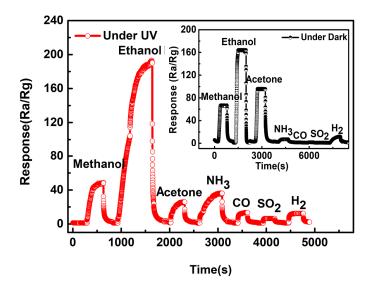


Fig. S3 Response curve of the ZnO film sensor to different concentrations of  $C_2H_5OH$  from 0.1 to 200 ppm under dark and under UV LED activation.



**Fig. S4** Responses curve of the ZnO film sensor to various gases of 1000 ppm under dark and under UV light illumination.