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Supporting information

Co-enhanced effect of Zn-doping and Ag-loading on the selectivity of a p-type Fe_2O_3 toward acetone

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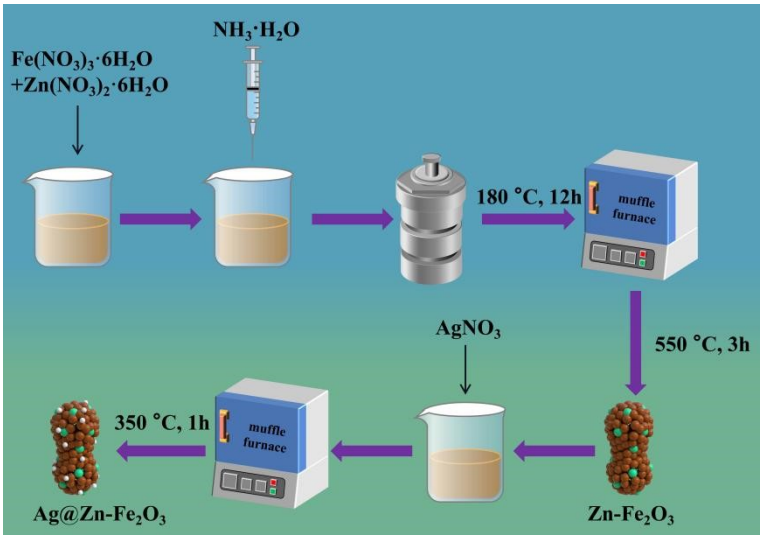

Fig. S1. The schematic illustration of the synthesis of $Ag@Zn\text{-}Fe_2O_3$.

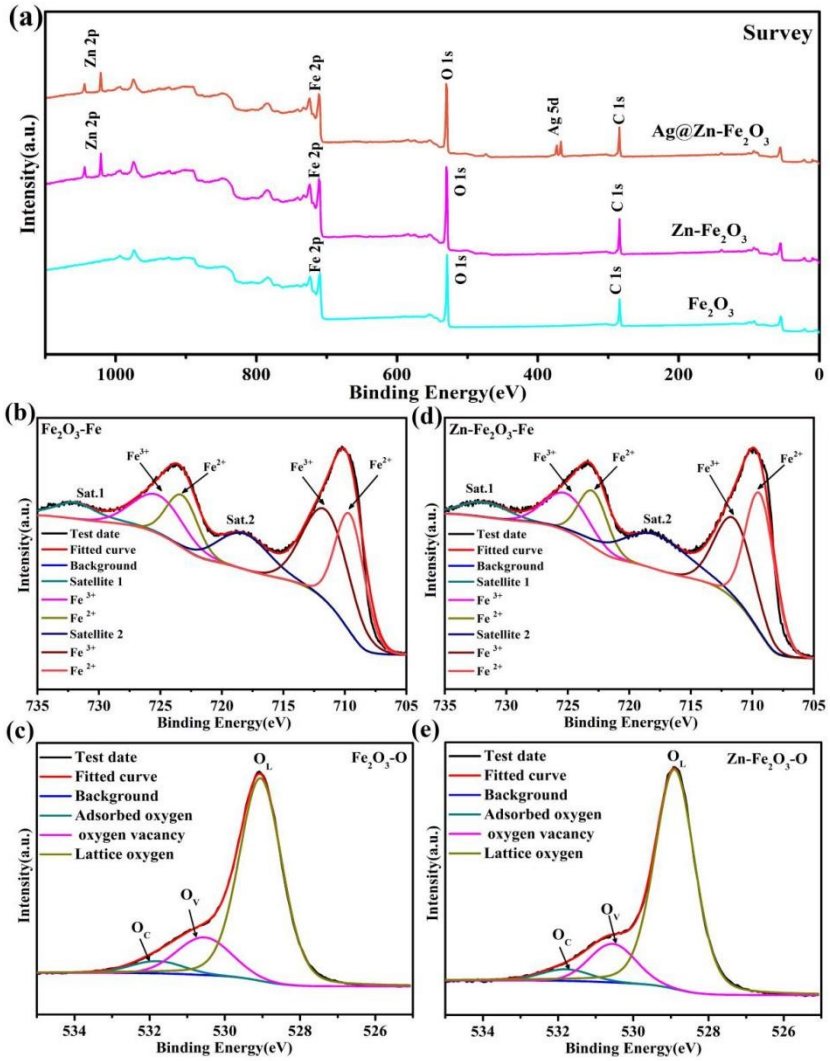

Fig. S2. (a) XPS survey scan spectrum of Fe_2O_3, $Zn\text{-}Fe_2O_3$, and $Ag@Zn\text{-}Fe_2O_3$, O 1s spectra of (b) Fe_2O_3 and (c) $Zn\text{-}Fe_2O_3$.

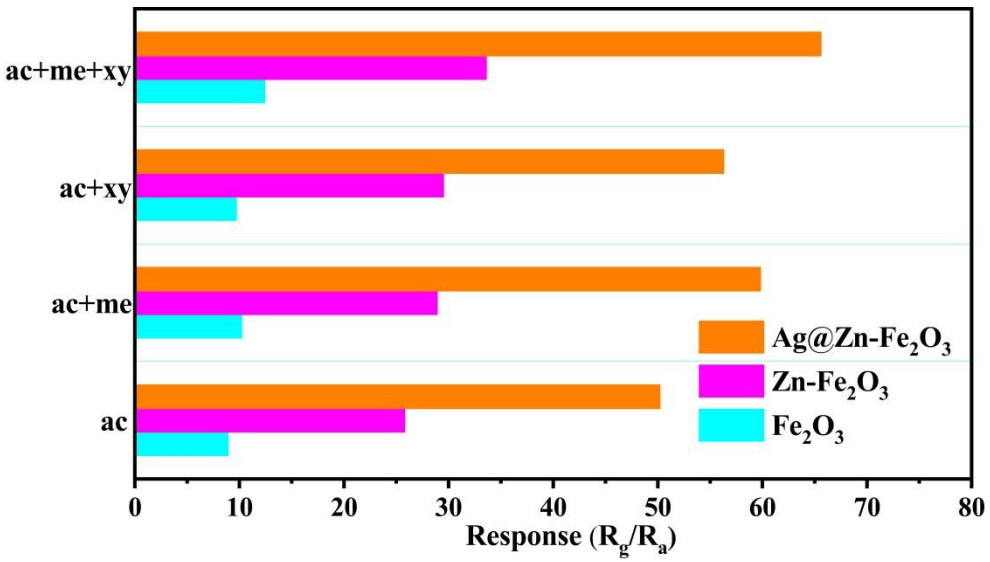

Fig. S3. Response of the Fe_2O_3, Zn-Fe_2O_3, and Ag@Zn-Fe_2O_3 sensors to mixture gases (100 ppm) at 172 or 150°C. (ac= acetone, me= methanol, and xy= xylene)

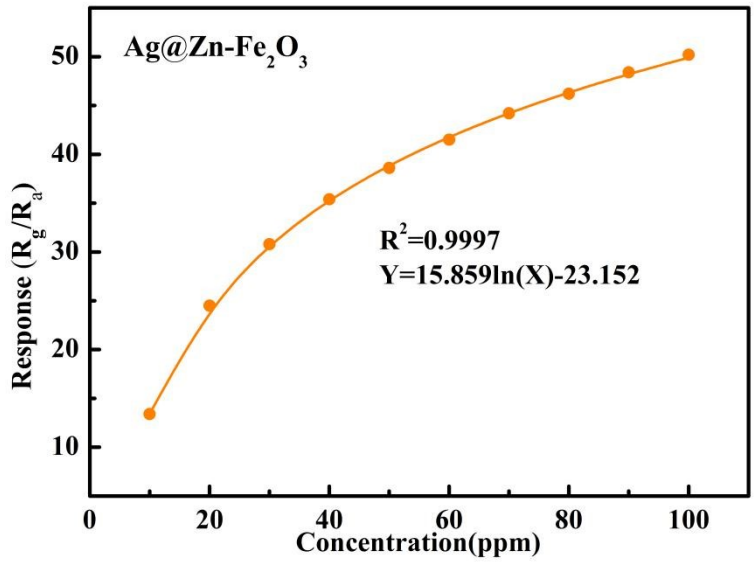

Fig. S4. Response of the Ag@Zn-Fe_2O_3 sensors as a function of acetone concentration (10-100 ppm) at 172 or 150°C.

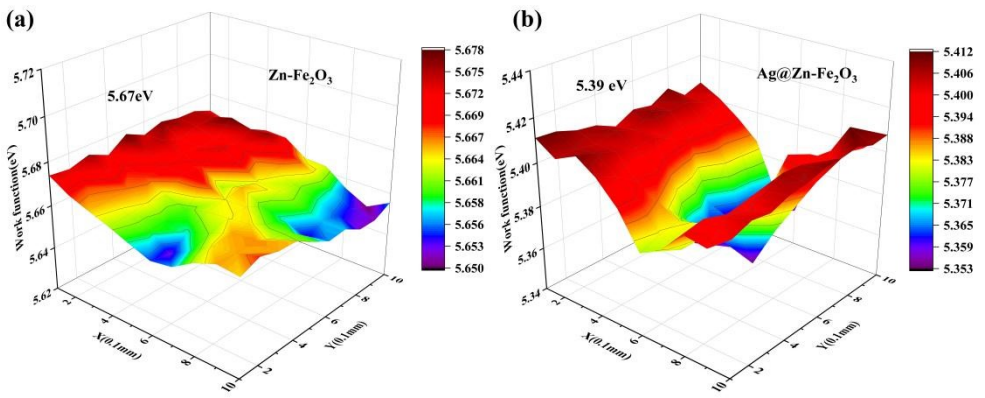

Fig. S5. Work function area scan record of (a) Zn-Fe_2O_3 and (b) Ag@Zn-Fe_2O_3 via Kelvin probe measurements.

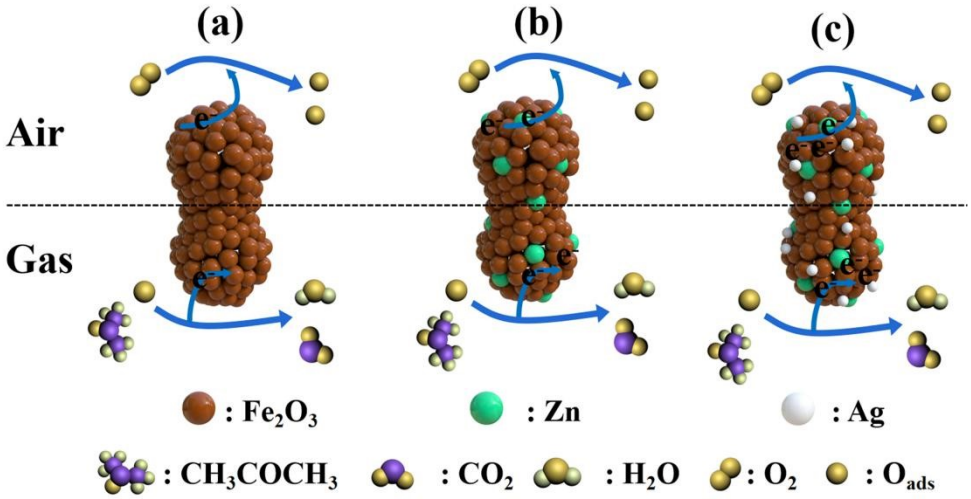

Fig. S6. Schematic of the gas sensing mechanism for the Fe_2O_3, Zn-Fe_2O_3, and Ag@Zn-Fe_2O_3 sensors.

element / Atomic % / Samples	Ag 3d	Zn 2p	Fe 2p	O 1s
Fe_2O_3	0	0	29.56	70.43
Zn-Fe_2O_3	0	2.29	27.72	69.98
Ag@Zn-Fe_2O_3	1.38	2.08	27.12	69.41

Table. S1. The relative percentage of Ag, Zn, Fe, and O elements in the Fe_2O_3, Zn-Fe_2O_3, and Ag@Zn-Fe_2O_3 samples of XPS analysis.

O Atomic % Samples	O_L	O_V	O_C
Fe_2O_3	81.46	13.82	4.71
Zn-Fe_2O_3	79.08	17.55	3.36
Ag@Zn-Fe_2O_3	75.38	20.51	4.08

Table. S2. The relative percentage of O_L, O_V, and O_C in the Fe_2O_3, Zn-Fe_2O_3, and Ag@Zn-Fe_2O_3 samples of XPS analysis.