

RF Sputtered ZnO Nanoballs on Porous Silicon Substrate for Highly Sensitive NO₂ Gas Sensing Applications

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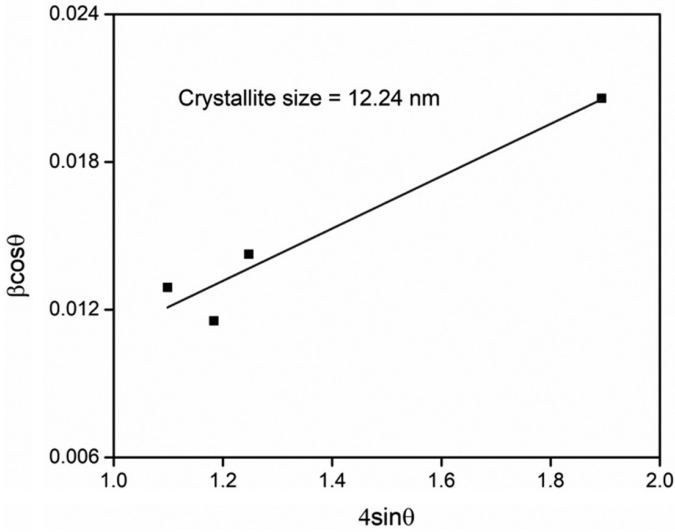
Figure S1

Figure S1: The W-H plot for as deposited ZnO sensing layer.

Figure S1 shows the Williamson-Hall plot for ZnO sensing electrode. It can be seen that the average crystallite size was found to be 12.24 nm and the micro strain in the ZnO film was observed to be 0.01063.

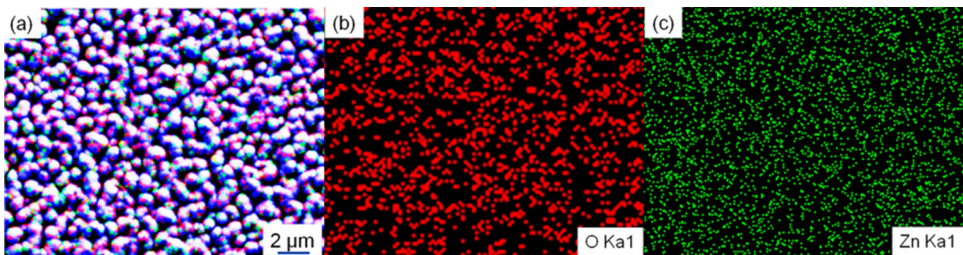
Figure S2

Figure S2: The EDS mapping of as prepared ZnO thin film sample.

Figure S2 depicts the EDS mapping analysis of as synthesized ZnO sensing layer. It can be seen that Zn and O are uniformly distributed over the sensor surface.

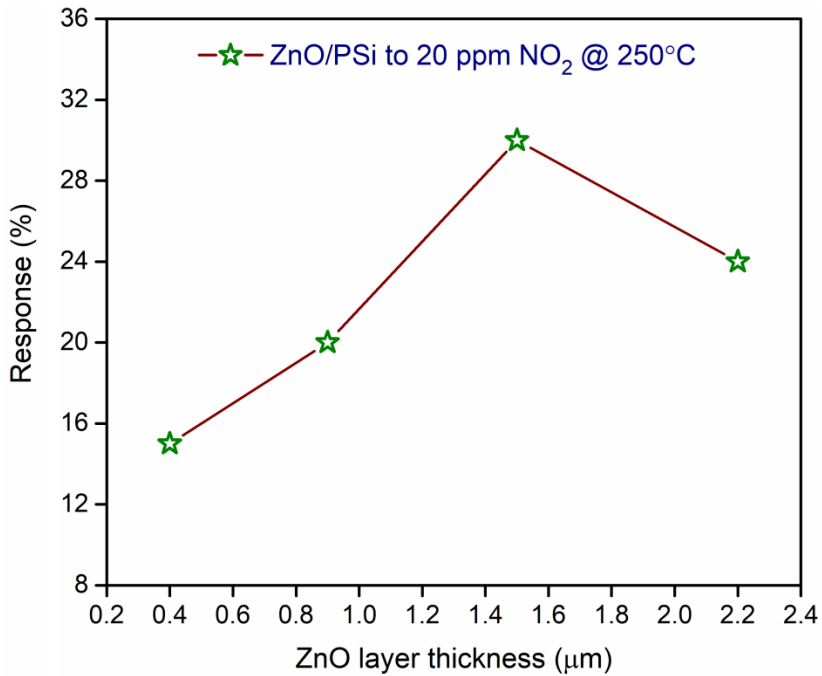
Figure S3

Figure S3: Variation in sensor response with ZnO layer thickness.

Here, the variation in sensing response with film thickness was also investigated. Figure S3 reveals that the response to 20 ppm NO_2 at 250°C was observed to be maximum for 1.5 μm ZnO sensing layer.

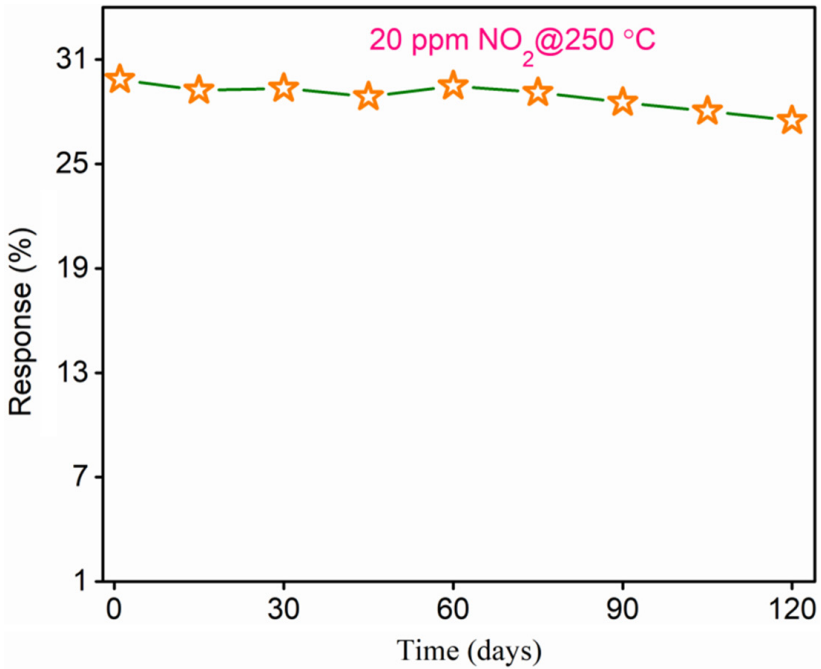
Figure S4

Figure S4: The stability curve for ZnO/PSi sensing element.

The stability test of the proposed sensing element was carried out to 20 ppm NO₂ in dry air at 250°C for 4 months (Figure S4).

Table S1Table S1: Brief summary of previous reported literature for ZnO based NO₂ gas sensor

Sensor (metal oxide)	Fabrication technique	NO ₂ ppm	Operating Temp. (°C)	Sensing response	Response/recovery time	Ref.
ZnO Thin Film	SILAR Method	100	150	580 %	--/--	[1]
rGO/ZnO	Hydrothermal	20	RT	13 %	--/--	[2]
ZnO/rGO	Hydrothermal process	2	150	13.46 %	26 sec/164 sec	[3]
ZnO nanowalls	Facial Solution	50	RT	480 %	23 sec/11 sec	[4]
SnO ₂ /ZnO Heterostructure	Sputtering	100	100	66.9 %	20 sec./45 sec.	[5]
ZnO/PSi thin film	Sputtering	20	250	29.2	70 sec/96 sec	Present work

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