

**Supporting information**

**Multifunctional zinc oxide thin films for high performance UV photodetector and nitrogen dioxide gas sensor**

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**Table 1- Values of various physical parameters calculated using XRD pattern, AFM images, and optical study of ZnO thin films deposited at different deposition cycles**

Parameters	ZnO thin film at various deposition cycles			
	Sample 30	Sample 40	Sample 50	Sample 60
Thickness (nm)	780	810	750	720
Roughness (nm)	277	461	268	137
Grain diameter	277	461	268	137
Band Gap (eV)	3.34	3.33	3.34	3.35

**Table 2- A comparison of responsivity of fabricated ZnO thin film based UV Photodetector, with other UV photodetectors fabricated using different deposition techniques**

<b>Method of deposition</b>	<b>Structure of the UV photodetector</b>	<b>Contact electrode used</b>	<b>Value of responsivity (A/W)</b>	<b>References</b>
Dielectrophoresis method	Metal-semiconductor-metal (MSM) structure	Au	40 A/W	[33]
Single-step hydrothermal reaction	MSM structure	Sn and Ni electrode	With Sn- 120 A/W With Ni- 60 A/W	[34]
Metal-organic chemical vapour deposition	MSM structure	Combine layer of Cr and Au electrode	1.86 A/W	[35]
Spin-coating colloidal synthesis of nanoparticles	MSM structure	Au electrode	61 A/W	[36]
Surface Plasmon Polariton technique	MSM structure	Al electrode with Ag nanoparticles	51.3 A/W	[37]

**Table 3 -The variation in the exponent ‘ $\theta$ ’ of the power relation devices fabricated at various deposition cycles of SILAR method.**

<b>ZnO thin films</b>	<b>Exponent of light intensity P</b>	<b>Power-law relation</b>
<b>Sample 30</b>	1.39	$I = P^{1.39}$
<b>Sample 40</b>	1.67	$I = P^{1.67}$
<b>Sample 50</b>	1.63	$I = P^{1.63}$
<b>Sample 60</b>	1.63	$I = P^{1.63}$

**Table 4 - Selectivity coefficient of ZnO thin film at operating temperature 175°C towards various gases**

<b>Gas</b>	<b>Selectivity coefficient</b>
LPG	16
SO <sub>2</sub>	12
NH <sub>3</sub>	22
Cl <sub>2</sub>	13
CO	13
CO <sub>2</sub>	11

**Table 5 - Comparison of response and recovery time of Sample 40 for 60 ppm NO<sub>2</sub> gas concentration at different operating temperatures**

<b>Operating temperature (°C)</b>	<b>Response time (s)</b>	<b>Recovery time (s)</b>
<b>50</b>	1238	>16000
<b>75</b>	2495	13361
<b>100</b>	106	5455
<b>125</b>	88	5730
<b>150</b>	38	1950
<b>175</b>	24	1093
<b>200</b>	7	712
<b>225</b>	6	618
<b>250</b>	6	308