Supplementary files

Table S1. Parameters of gas sensors based on porous 2D metal oxide nanostructures

Material (Form) (Technology)	GST	STR	T, nm	PD, μm	PS, nm	T_{oper}, °C	Target gas	C_{gas}, ppm	Response	DL, ppm	Res./ Rec. time, s	Ref.
SnO_2 (NF) (SnS_2 calcination)	DC	3D	~30	0.5-1.0	~18	220	Ethanol	100	R_{air}/R_{gas} ~ 7	<5	8/17	1
SnO_2 (NF) (HT)	CT	3D	N/A	N/A	N/A	200	Ethanol	200	R_{air}/R_{gas} ~46	<20	6/5	2
SnO_2:CeO_2 (NS) (HT)	CT	2D	15-30	0.8-1.0	20-30	340	Ethanol	100	R_{air}/R_{gas} ~44	<5	25/6	3
SnO_2:CeO_2 (NS)	CT	2D	N/A	10-15	10-15	160	3H-2B	50	R_{air}/R_{gas} ~620	~1	29/172	4
SnO_2:NiO(5%) (NS) (HT)	CT	3D	10-20	1-2	3-4	100	HCHO	100	R_{air}/R_{gas} ~39	<5	28/115	5
SnO_2 (NS) (HT)						200			R_{air}/R_{gas} ~11		53/99	
SnO_2 (NS) (HT)	CT	3D	N/A	~2	27	340	Acetic acid	100	R_{air}/R_{gas} ~132	<20	11/6	6
WO_3 (NF) (LA)	DC	2D	~50	1.5-3.5	~20	250	Ethanol	100	R_{air}/R_{gas} ~ 3	<10	N/A	7
WO_3:Pd (NF) (ST)	ISG	3D	20-40	~1	4-100	200	NO	20	R_{gas} /R_{air} ~200	<1	135/50	8
WO_3 (NS) (CBD)	ISG	3D	20	N/A	N/A	100	NO_2	10	R_{gas} /R_{air} ~ 460	< 1	54/63	9
WO_3–rGO(20%) (NS) (HT)	CT	2D	N/A	0.3-0.5	N/A	90	NO_2	10	R_{gas} /R_{air} ~4	1-2	10/9	10
ZnO (NF) (HT)	CT	2D	N/A	N/A	N/A	350	Ethanol	50	R_{air}/R_{gas} ~ 22	N/A	12/14	11
		3D		1-2					R_{air}/R_{gas} ~ 87		7/9	
ZnO (NF) (PM)	ISG	3D	~9	0.4-0.7	3-50	250	Ethanol	50	R_{air}/R_{gas} ~ 37	<2	14/8	12
ZnO (NS) (HT)	CT	2D	~100	N/A	~80	400	Ethanol	100	R_{air}/R_{gas} ~11	<10	12/231	13
ZnO (NS) (CS)	CT	3D	12-20	3-5	~5	320	Ethanol	100	R_{air}/R_{gas} ~24	< 1	3/15	14
ZnO (NS) (HT)	CT	3D	10-40	3-6	9-45	400	Ethanol	200	R_{air}/R_{gas} ~400	~0.0.1	N/A	15
ZnO (NS) (ST)	CT	3D	20-40	1-2	7-25	280	Ethanol Acetone	100	R_{air}/R_{gas} ~24 R_{air}/R_{gas} ~32	<5	6/23 5/28	16
ZnO (NF) (HT)	CT	3D	20	1-3	3-40	420	Acetone	100	R_{air}/R_{gas} ~17	<5	9/8	17
ZnO (NS) (HT)	ISG	3D	N/A	~0.5	2-10	400 400 200	Ethanol Acetone H_2S	50 50 2.5	R_{air}/R_{gas} ~5 R_{air}/R_{gas} ~16 R_{air}/R_{gas} ~ 163	9/22 9/22 3/43	~2 <1 <1	18
ZnO (NS) (CS)	CT	2D	2.9-3.4	N/A	N/A	340	$C_5H_8O_2$	100	R_{air}/R_{gas}~190	~ 1	19/94	19
ZnO (NF) (MHT)	CT	3D	40-80	N/A	30-60	170	NO_2	0.5	R_{gas} /R_{air} ~ 125	<0.1	N/A	20
ZnO (NS) (ST)	DC	2D	80	~1	60	200	NO_2	0.01	R_{gas} /R_{air} ~75	~0.1	N/A	21
ZnO (NS) (HT)	SP	2D	~15	0.5	~26	250	NH_3	100	R_{air}/R_{gas} ~6	< 10	8/17	22

							HCHO		R_{air}/R_{gas} ~4		13/22	
ZnO (NS) (HT)	CT	3D	30-80	1-2	~40	370	DMA	200	R_{air}/R_{gas} ~2000	<1	16/15	23
ZnO:Pd (NS) (CS+R)	ISG	3D	N/A	~1	N/A	220	CO	100	R_{air}/R_{gas} ~15	20	100/255	24
ZnO (NS) (CS)	CT	2D	N/A	1-2	14	320	Isopropanol	100	R_{air}/R_{gas} ~10	~1	N/A	25
ZnO:CdS (NS) (CS)					47				R_{air}/R_{gas} ~33	N/A		
In_2O_3 (NS) (ST)	CT	3D	20	1-2	~50	140	NO_2	0.2	R_{gas}/R_{air} ~ 40	<0.01	N/A	26
In_2O_3 (NS) (HT)	CT	3D	15-30	1-2	5-25	RT	NO_2	0.5	R_{gas}/R_{air} ~620	N/A	600/900	27
In_2O_3 (NS) (HT)	CT	2D	~4	0.5	~4	120	NO_x	10	R_{gas}/R_{air} ~213	~0.01	4/10	28
In_2O_3 (NS) (HT)	CT	3D	~3	~1	3-5	270	Ethanol	100	R_{air}/R_{gas} ~ 66	~0.5	12/10	29
In_2O_3:Ag,Pd (NS) (CS)	CT	3D	N/A	3.5-5	2-50	180	Toluene,	1	R_{air}/R_{gas} ~ 16	~0.02	7/13	30
In_2O_3:Yb (NS) (ST)	CT	2D	23	0.2	N/A	220	Acetone	50	R_{air}/R_{gas} ~15	<5	<10/<10	31
Co_3O_4 (NS) (HT)	CT	2D	30	3-5	~3	150	Acetone	100	R_{air}/R_{gas} ~ 11	<10	N/A	32
Co_3O_4:Mn (NS) (ST)	CN	2D	N/A	N/A	2.3	125	CO	40	R_{air}/R_{gas} ~ 3.8	0.5	12/26	33
Co_3O_4:CdS (NS)	ISG	3D	3	1	2-100	RT	H_2S	100	R_{air}/R_{gas} ~13	1-5	0.6/1	34
CuO(NS) (HT)	ISG	2D	62	0.5-1.2	5-17	RT	H_2S	0.01	R_{air}/R_{gas} ~1.25	N/A	234/76	35
CeO_2 (NS) (HT-D)	N/A	2D	N/A	N/A	~15	450	CO	500	R_{air}/R_{gas} ~1.12	~10	2/2	36
TiO_2:Pd (NS) (TM)	CT	2D	N/A	1-10	3-8	230	H_2	1000	R_{air}/R_{gas} ~9	~1	1.6/1.4	37
CuO (NS) (HT-D) c-CuO	CT	3D	N/A	~1	15-30	260	Ethanol HCHO	100	R_{air}/R_{gas} ~15 R_{air}/R_{gas} ~11	< 1	13/8 15/17	38
CuO (NS) (HT-D) *a*-CuO							Ethanol HCHO	50	R_{air}/R_{gas} ~40 R_{air}/R_{gas} ~50	<0.1	11/6 8/16	
CuO(NF)-rGO (HT)	DC	2D	20-40	>1	2-2.5	23	NO_2	100	R_{air}/R_{gas} ~150	<0.05	7/50	39
NiO (NS) (SCS)	ISG	2D	N/A	N/A	N/A	200	Ethanol	100	R_{air}/R_{gas} ~ 2	<10	N/A	40
NiO (NS) (HT)	DC	3D	N/A	0.3-0.35	~5	150	NH_3	15	R_{air}/R_{gas}~1.9	<2	140/70	41
NiO (NS)	ISG	3D	<10	<1	1.5-15	225	Acetone	0.1	R_{air}/R_{gas}~6	<0.01	N/A	42
NiO (NS) (HT)	CT	2D	~15-20	0.2-0.4	~90	92	N_2H_4	100	R_{air}/R_{gas}~110	~0.01	50/30	43
V_2O_5-NiO (NS) (CS)	SP	3D	~5	~20	N/A	200	H_2S	0.5	R_{air}/R_{gas} ~6.5	0.02	8/25	44
NiO:Fe_2O_3(1.5%) (NS) (CS-D)	CT	3D	N/A	N/A	~23	255	Ethanol Methanol	100	R_{air}/R_{gas} ~170 R_{air}/R_{gas} ~108	<5	0.5/15 0.1/11	45

$C_5H_8O_2$ – acetylacetone; CBD – chemical bath deposition; C(gas) – gas concentration; CS - chemical synthesis; CS+R - chemical synthesis+ reduction; CT - ceramic technology; DC - drop-casting method; DL – detector limit; DMA - dimethylamine; GST – gas sensor technology; 3H-2B - 3-hydroxy-2-butanone; HCHO – formaldehyde; HT –hydrothermal; HT-D – hydrothermal synthesis +decomposition; ISG - in-situ growth; LA – pulse laser ablation; MHT – microwave hydrothermal; N/A – not available; NF- nanoflakes; NS – nanosheets; PD - planar dimension; PM – precipitation method; PS - pore size; rGO – reduced graphene

oxide; RT – room temperature; SC - sonochemical method; SCS - solution combustion synthesis; SP - screen-printing; ST – solvothermal process; STR – structure; T - thickness; TM – template method;

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