Supporting Information

Olivine-type cadmium germanate: A new sensing semiconductor for the detection of formaldehyde at ppb level

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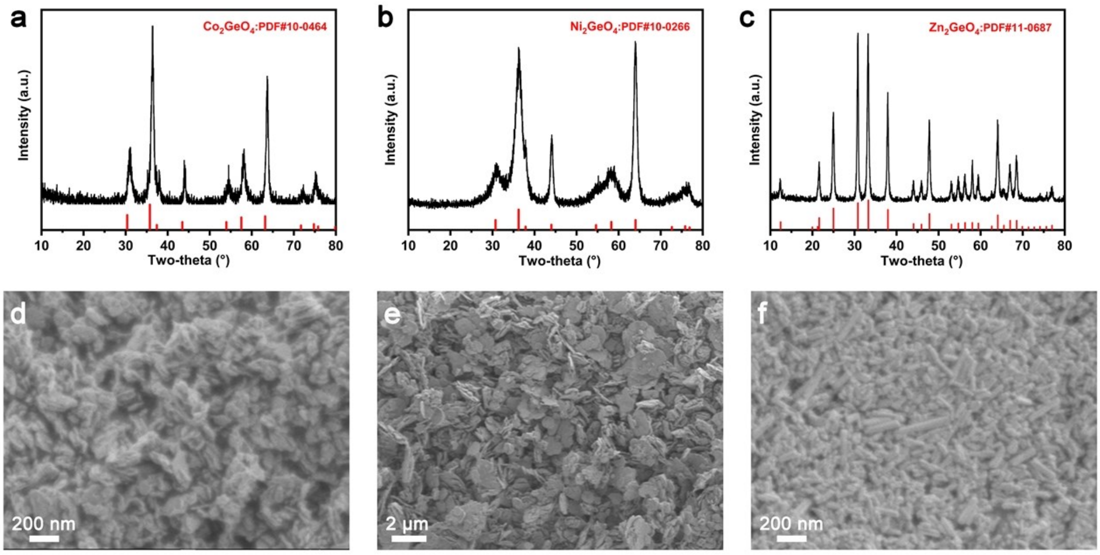

Fig. S1 (a-c) XRD patterns and (d-f) SEM images of Co_2GeO_4, Ni_2GeO_4 and Zn_2GeO_4, respectively.

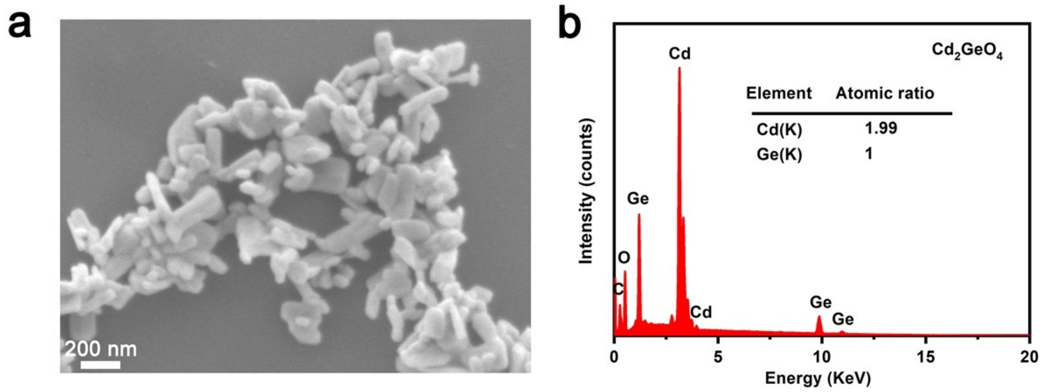

Fig. S2 (a) SEM image and (b) EDS spectrum of Cd_2GeO_4.

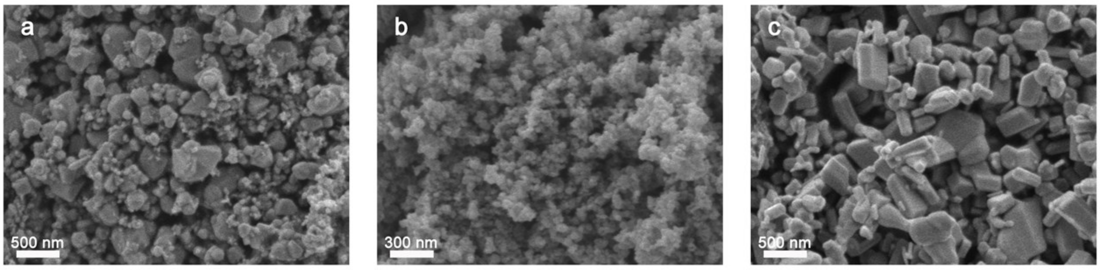

Fig. S3 SEM image of (a) SnO_2, (b) In_2O_3 and (c) ZnO, respectively.

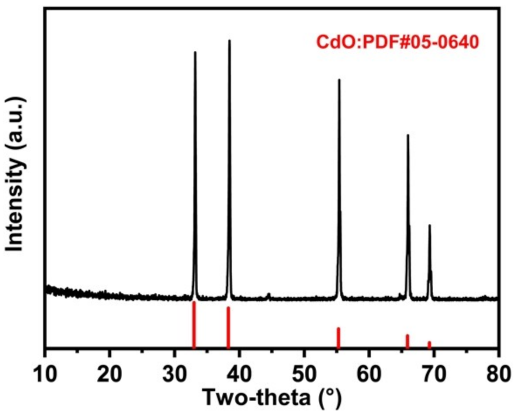

Fig. S4 XRD patterns and the standard PDF card of CdO (PDF No. 05-0640).

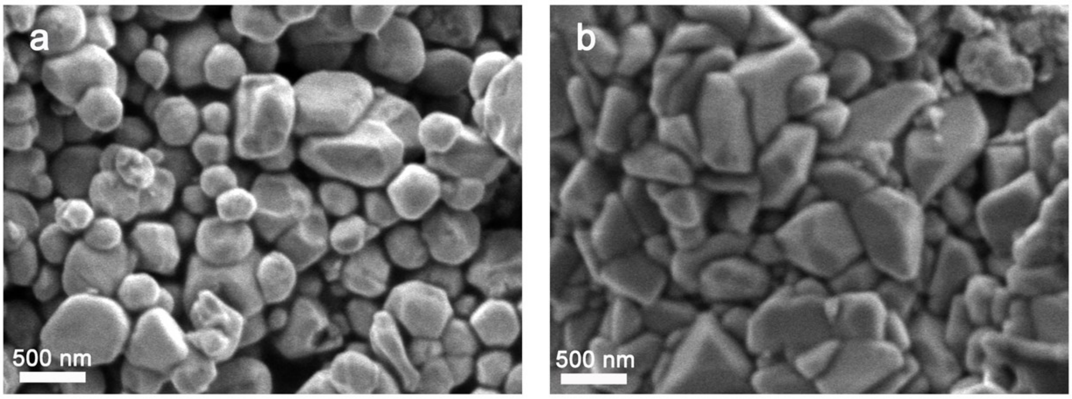

Fig. S5 SEM image of (a) CdO and (b) GeO_2.

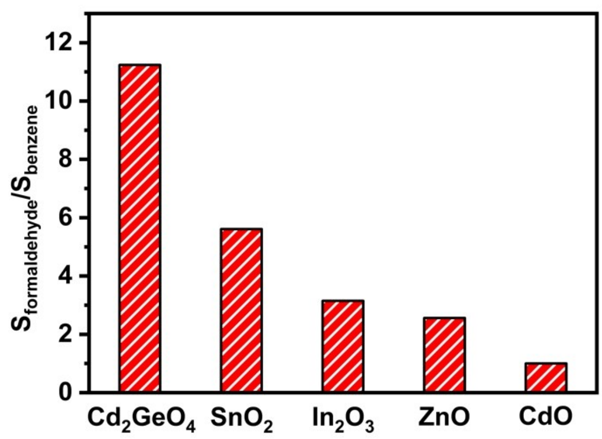

Fig. S6 The response of sensors based on Cd_2GeO_4, SnO_2, In_2O_3, ZnO and CdO to 10 ppm formaldehyde *vs* benzene ($S_{formaldehyde}/S_{benzene}$, 140 ^{o}C).

Table S1 Gas response, operating temperature, and Response-recovery times of different nanostructured metal oxides to formaldehyde, as reported in the recent literatures 1-11 and this work.

Sensing materials	**Synthetic method**	**BET surface area (m^2/g)**	**Conc. (ppm)**	**$S_{formaldehyde}$**	**T_{sens} (^oC)**	**t_{res}/t_{rec} (s)**	**Ref.**
ZnO	Hydrothermal	-	100	9.6	275	16/28	1
In_2O_3	Hydrothermal	129.81	20	≈5	130	-	2
SnO_2	Hydrothermal	38.31	100	10.6	200	53/99	3
WO_3	Hydrothermal	-	100	6.5	350	9/6	4
NiO	Hydrothermal	109	100	≈12	300	-	5
CuO	Hydrothermal	6.91	0.8	≈1.2	300	45/106	6
$ZnSnO_3$	Precipitation	37	100	10.7	220	6/80	7
$LaFeO_3$	Sol–gel	-	50	14.2	100	33/27	8
$ZnCo_2O_4$	Hydrothermal	121	100	7.4	180	9/12	9
$CdGa_2O_4$	Electrospinning	27	10	18.4	100	7/130	10
Zn_2SnO_4	Hydrothermal	-	10	10.1	160	-	11
Cd_2GeO_4	Hydrothermal	≈10	10	14.1	140	5/99	This work

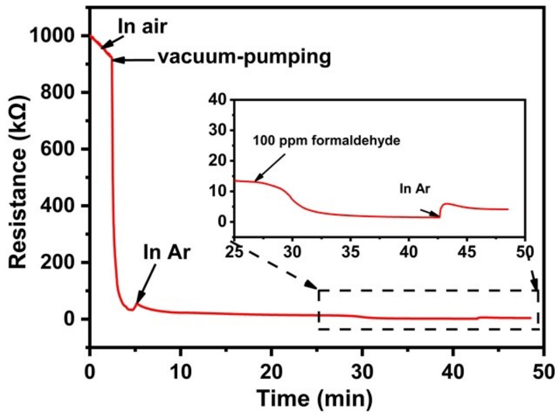

Fig. S7 The change in resistance of sensor based on Cd_2GeO_4 during vacuum extraction and gas-sensing properties of sensor based on Cd_2GeO_4 was measured in the absence of background oxygen using a homemade device.

References for SI

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