

A Statistical Analysis of Response and Recovery Times: The Case of Ethanol Chemiresistors Based on Pure SnO₂

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Table S1. List of articles used as source for analysis

N.	Article
1	Cho, Y.H.; Liang, X.; Kang, Y.C.; Lee, J.-H. Ultrasensitive Detection of Trimethylamine Using Rh-Doped SnO ₂ Hollow Spheres Prepared by Ultrasonic Spray Pyrolysis. <i>Sens. Actuators B Chem.</i> 2015 , <i>207</i> , 330–337, doi:10.1016/j.snb.2014.10.001.
2	Choi, K.S.; Park, S.; Chang, S.-P. Enhanced Ethanol Sensing Properties Based on SnO ₂ Nanowires Coated with Fe ₂ O ₃ Nanoparticles. <i>Sens. Actuators B Chem.</i> 2017 , <i>238</i> , 871–879, doi:10.1016/j.snb.2016.07.146.
3	Cui, Y.; Zhang, M.; Li, X.; Wang, B.; Wang, R. Investigation on Synthesis and Excellent Gas-Sensing Properties of Hierarchical Au-Loaded SnO ₂ Nanoflowers. <i>J. Mater. Res.</i> 2019 , <i>34</i> , 2944–2954, doi:10.1557/jmr.2019.249.
4	Fan, X.-X.; He, X.-L.; Li, J.-P.; Gao, X.-G.; Jia, J. Ethanol Sensing Properties of Hierarchical SnO ₂ Fibers Fabricated with Electrospun Polyvinylpyrrolidone Template. <i>Vacuum</i> 2016 , <i>128</i> , 112–117, doi:10.1016/j.vacuum.2016.03.016.
5	Francioso, L.; De Pascali, C.; Creti, P.; Radogna, A.V.; Capone, S.; Taurino, A.; Epifani, M.; Baldacchini, C.; Bizzarri, A.R.; Siciliano, P.A. Nanogap Sensors Decorated with SnO ₂ Nanoparticles Enable Low-Temperature Detection of Volatile Organic Compounds. <i>ACS Appl. Nano Mater.</i> 2020 , <i>3</i> , 3337–3346, doi:10.1021/acsanm.0c00066.
6	Gu, C.D.; Zheng, H.; Wang, X.L.; Tu, J.P. Superior Ethanol-Sensing Behavior Based on SnO ₂ Mesocrystals Incorporating Orthorhombic and Tetragonal Phases. <i>RSC Adv.</i> 2015 , <i>5</i> , 9143–9153, doi:10.1039/C4RA13940B.
7	Gulevich, D.; Rumyantseva, M.; Gerasimov, E.; Khmelevsky, N.; Tsvetkova, E.; Gaskov, A. Synergy Effect of Au and SiO ₂ Modification on SnO ₂ Sensor Properties in VOCs Detection in Humid Air. <i>Nanomaterials</i> 2020 , <i>10</i> , 813, doi:10.3390/nano10040813.
8	Guo, J.; Zhang, J.; Gong, H.; Ju, D.; Cao, B. Au Nanoparticle-Functionalized 3D SnO ₂ Microstructures for High Performance Gas Sensor. <i>Sens. Actuators B Chem.</i> 2016 , <i>226</i> , 266–272, doi:10.1016/j.snb.2015.11.140.
9	Guo, W.; Wang, Z. Composite of ZnO Spheres and Functionalized SnO ₂ Nanofibers with an Enhanced Ethanol Gas Sensing Properties. <i>Mater. Lett.</i> 2016 , <i>169</i> , 246–249, doi:10.1016/j.matlet.2016.01.118.
10	Hoa, L.T.; Cuong, N.D.; Hoa, T.T.; Khieu, D.Q.; Long, H.T.; Quang, D.T.; Hoa, N.D.; Hieu, N.V. Synthesis, Characterization, and Comparative Gas Sensing Properties

	of Tin Dioxide Nanoflowers and Porous Nanospheres. <i>Ceram. Int.</i> 2015 , <i>41</i> , 14819–14825, doi:10.1016/j.ceramint.2015.08.003.
11	Hyun, S.K.; Sun, G.-J.; Lee, J.K.; Lee, C.; In Lee, W.; Kim, H.W. Ethanol Gas Sensing Using a Networked PbO-Decorated SnO ₂ Nanowires. <i>Thin Solid Films</i> 2017 , <i>637</i> , 21–26, doi:10.1016/j.tsf.2017.02.054.
12	Jayababu, N.; Poloju, M.; Shruthi, J.; Reddy, M.V.R. Semi Shield Driven P-n Heterostructures and Their Role in Enhancing the Room Temperature Ethanol Gas Sensing Performance of NiO/SnO ₂ Nanocomposites. <i>Ceram. Int.</i> 2019 , <i>45</i> , 15134–15142, doi:10.1016/j.ceramint.2019.04.255.
13	Jiang, X.H.; Ma, S.Y.; Sun, A.M.; Zhang, Z.M.; Jin, W.X.; Wang, T.T.; Li, W.Q.; Xu, X.L.; Luo, J.; Cheng, L.; et al. Hydrothermal Self-Assembly of Novel Porous Flower-like SnO ₂ Architecture and Its Application in Ethanol Sensor. <i>Appl. Surf. Sci.</i> 2015 , <i>355</i> , 1192–1200, doi:10.1016/j.apsusc.2015.08.014.
14	Jiang, Z.; Jiang, T.; Wang, J.; Wang, Z.; Xu, X.; Wang, Z.; Zhao, R.; Li, Z.; Wang, C. Ethanol Chemiresistor with Enhanced Discriminative Ability from Acetone Based on Sr-Doped SnO ₂ Nanofibers. <i>J. Colloid Interface Sci.</i> 2015 , <i>437</i> , 252–258, doi:10.1016/j.jcis.2014.09.056.
15	Kim, B.-Y.; Cho, J.S.; Yoon, J.-W.; Na, C.W.; Lee, C.-S.; Ahn, J.H.; Kang, Y.C.; Lee, J.-H. Extremely Sensitive Ethanol Sensor Using Pt-Doped SnO ₂ Hollow Nanospheres Prepared by Kirkendall Diffusion. <i>Sens. Actuators B Chem.</i> 2016 , <i>234</i> , 353–360, doi:10.1016/j.snb.2016.05.002.
16	Kotchasek, N.; Wisitsoraat, A.; Tuantranont, A.; Phanichphant, S.; Yordsri, V.; Liewhiran, C. Highly Sensitive and Selective Detection of Ethanol Vapor Using Flame-Spray-Made CeO _x -Doped SnO ₂ Nanoparticulate Thick Films. <i>Sens. Actuators B Chem.</i> 2018 , <i>255</i> , 8–21, doi:10.1016/j.snb.2017.08.027.
17	Kuang, X.; Liu, T.; Li, T.; Zeng, W.; Peng, X.; Zhang, H. Hydrothermal Synthesis of SnO ₂ Hierarchical Nanostructures and Their Gas Sensing Properties. <i>Mater. Technol.</i> 2016 , <i>31</i> , 260–265, doi:10.1179/1753555715Y.0000000051.
18	Kuang, X.; Liu, T.; Shi, D.; Wang, W.; Yang, M.; Hussain, S.; Peng, X.; Pan, F. Hydrothermal Synthesis of Hierarchical SnO ₂ Nanostructures Made of Superfine Nanorods for Smart Gas Sensor. <i>Appl. Surf. Sci.</i> 2016 , <i>364</i> , 371–377, doi:10.1016/j.apsusc.2015.12.172.
19	Lee, D.H.; Kang, S.K.; Pak, Y.; Lim, N.; Lee, R.; Kumaresan, Y.; Lee, S.; Lee, C.; Ham, M.-H.; Jung, G.Y. Transfer of Preheat-Treated SnO ₂ via a Sacrificial Bridge-Type ZnO Layer for Ethanol Gas Sensor. <i>Sens. Actuators B Chem.</i> 2018 , <i>255</i> , 70–77, doi:10.1016/j.snb.2017.08.025.
20	Lee, S.-H.; Galstyan, V.; Ponzoni, A.; Gonzalo-Juan, I.; Riedel, R.; Dourges, M.-A.; Nicolas, Y.; Toupance, T. Finely Tuned SnO ₂ Nanoparticles for Efficient Detection of Reducing and Oxidizing Gases: The Influence of Alkali Metal Cation on Gas-Sensing Properties. <i>ACS Appl. Mater. Interfaces</i> 2018 , <i>10</i> , 10173–10184, doi:10.1021/acsami.7b18140.
21	Li, F.; Gao, X.; Wang, R.; Zhang, T. Design of WO ₃ -SnO ₂ Core-Shell Nanofibers and Their Enhanced Gas Sensing Performance Based on Different Work Function. <i>Appl. Surf. Sci.</i> 2018 , <i>442</i> , 30–37, doi:10.1016/j.apsusc.2018.02.122.
22	Li, H.; Zhu, D.; Yang, Z.; Lu, W.; Pu, Y. The Ethanol-Sensitive Property of Hierarchical MoO ₃ -Mixed SnO ₂ Aerogels via Facile Ambient Pressure Drying. <i>Appl. Surf. Sci.</i> 2019 , <i>489</i> , 384–391, doi:10.1016/j.apsusc.2019.05.368.

23	Li, H.; Chu, S.; Ma, Q.; Li, H.; Che, Q.; Wang, J.; Wang, G.; Yang, P. Multilevel Effective Heterojunctions Based on SnO ₂ /ZnO 1D Fibrous Hierarchical Structure with Unique Interface Electronic Effects. <i>ACS Appl. Mater. Interfaces</i> 2019 , <i>11</i> , 31551–31561, doi:10.1021/acsami.9b10410.
24	Li, R.; Chen, S.; Lou, Z.; Li, L.; Huang, T.; Song, Y.; Chen, D.; Shen, G. Fabrication of Porous SnO ₂ Nanowires Gas Sensors with Enhanced Sensitivity. <i>Sens. Actuators B Chem.</i> 2017 , <i>252</i> , 79–85, doi:10.1016/j.snb.2017.05.161.
25	Li, S.-H.; Meng, F.-F.; Chu, Z.; Luo, T.; Peng, F.-M.; Jin, Z. Mesoporous SnO ₂ Nanowires: Synthesis and Ethanol Sensing Properties. <i>Adv. Condens. Matter Phys.</i> 2017 , <i>2017</i> , 9720973, doi:10.1155/2017/9720973.
26	Li, T.; Zeng, W. New Insight into the Gas Sensing Performance of SnO ₂ Nanorod-Assembled Urchins Based on Their Assembly Density. <i>Ceram. Int.</i> 2017 , <i>43</i> , 728–735, doi:10.1016/j.ceramint.2016.10.001.
27	Li, T.; Zeng, W.; Zhao, W. Gas Sensing Performance of Multiple SnO ₂ 1D Nanostructures Based on Their Interconnect Manner. <i>Mater. Lett.</i> 2016 , <i>167</i> , 230–233, doi:10.1016/j.matlet.2016.01.013.
28	Lian, X.; Li, Y.; Zhu, J.; Zou, Y.; Liu, X.; An, D.; Wang, Q. Synthesis of Coryphantha Elephantidens-like SnO ₂ Nanospheres and Their Gas Sensing Properties. <i>Curr. Appl. Phys.</i> 2019 , <i>19</i> , 849–855, doi:10.1016/j.cap.2019.04.016.
29	Liang, Y.-C.; Lee, C.-M.; Lo, Y.-J. Reducing Gas-Sensing Performance of Ce-Doped SnO ₂ Thin Films through a Cosputtering Method. <i>RSC Adv.</i> 2017 , <i>7</i> , 4724–4734, doi:10.1039/C6RA25853K.
30	Ling-min, Y.; Sheng, L.; Bing, Y.; Miao-miao, H.; Meng-di, K.; Xinhui, F. A Highly Sensitive Ethanol Gas Sensor Based on Mesoporous SnO ₂ Fabricated from a Facile Double-Surfactant Template Method. <i>Mater. Lett.</i> 2015 , <i>158</i> , 409–412, doi:10.1016/j.matlet.2015.06.047.
31	Liu, S.; Zhang, Y.; Yu, B.; Wang, Z.; Zhao, H.; Zhou, N.; Zhang, T. Solvent-Free Infiltration Method to Prepare Mesoporous SnO ₂ Templated by SiO ₂ Nanoparticles for Ethanol Sensing. <i>Sens. Actuators B Chem.</i> 2015 , <i>210</i> , 700–705, doi:10.1016/j.snb.2015.01.037.
32	Liu, Y.; Jiao, Y.; Zhang, Z.; Qu, F.; Umar, A.; Wu, X. Hierarchical SnO ₂ Nanostructures Made of Intermingled Ultrathin Nanosheets for Environmental Remediation, Smart Gas Sensor, and Supercapacitor Applications. <i>ACS Appl. Mater. Interfaces</i> 2014 , <i>6</i> , 2174–2184, doi:10.1021/am405301v.
33	Liu, Y.; Li, X.; Wang, Y.; Li, X.; Cheng, P.; Zhao, Y.; Dang, F.; Zhang, Y. Hydrothermal Synthesis of Au@SnO ₂ Hierarchical Hollow Microspheres for Ethanol Detection. <i>Sens. Actuators B Chem.</i> 2020 , <i>319</i> , 128299, doi:10.1016/j.snb.2020.128299.
34	Liu, Y.; Yang, P.; Li, J.; Matras-Postolek, K.; Yue, Y.; Huang, B. Morphology Adjustment of SnO ₂ and SnO ₂ /CeO ₂ One Dimensional Nanostructures towards Applications in Gas Sensing and CO Oxidation. <i>RSC Adv.</i> 2015 , <i>5</i> , 98500–98507, doi:10.1039/C5RA23446H.
35	Lou, Z.; Wang, L.; Wang, R.; Fei, T.; Zhang, T. Synthesis and Ethanol Sensing Properties of SnO ₂ Nanosheets via a Simple Hydrothermal Route. <i>Solid-State Electron.</i> 2012 , <i>76</i> , 91–94, doi:10.1016/j.sse.2012.05.062.
36	Naghadeh, S.B.; Vahdatifar, S.; Mortazavi, Y.; Khodadadi, A.A.; Abbasi, A. Functionalized MWCNTs Effects on Dramatic Enhancement of MWCNTs/SnO ₂

	Nanocomposite Gas Sensing Properties at Low Temperatures. <i>Sens. Actuators B Chem.</i> 2016 , 223, 252–260, doi:10.1016/j.snb.2015.09.088.
37	Pan, Z.; Sun, F.; Xu, S.; Long, J.; Chen, Y.; Zhuang, Z. A General Electrodeposition-Based Method for in Situ Construction of Resistive-Type Semiconductor Film Gas-Sensor with Excellent Sensing Performance. <i>RSC Adv.</i> 2015 , 5, 74075–74083, doi:10.1039/C5RA14153B.
38	Qiang, Z.; Ma, S.Y.; Jiao, H.Y.; Wang, T.T.; Jiang, X.H.; Jin, W.X.; Yang, H.M.; Chen, H. Highly Sensitive and Selective Ethanol Sensors Using Porous SnO ₂ Hollow Spheres. <i>Ceram. Int.</i> 2016 , 42, 18983–18990, doi:10.1016/j.ceramint.2016.09.053.
39	Qin, G.; Gao, F.; Jiang, Q.; Li, Y.; Liu, Y.; Luo, L.; Zhao, K.; Zhao, H. Well-Aligned Nd-Doped SnO ₂ Nanorod Layered Arrays: Preparation, Characterization and Enhanced Alcohol-Gas Sensing Performance. <i>Phys. Chem. Chem. Phys.</i> 2016 , 18, 5537–5549, doi:10.1039/C5CP07174G.
40	Qin, S.; Tang, P.; Feng, Y.; Li, D. Novel Ultrathin Mesoporous ZnO-SnO ₂ n-n Heterojunction Nanosheets with High Sensitivity to Ethanol. <i>Sens. Actuators B Chem.</i> 2020 , 309, 127801, doi:10.1016/j.snb.2020.127801.
41	Qu, Y.; Wang, H.; Chen, H.; Han, M.; Lin, Z. Synthesis, Characterization and Sensing Properties of Mesoporous C/SnO ₂ Nanocomposite. <i>Sens. Actuators B Chem.</i> 2016 , 228, 595–604, doi:10.1016/j.snb.2016.01.077.
42	Sankar, C.; Ponnuswamy, V.; Manickam, M.; Suresh, R.; Mariappan, R.; Vinod, P.S. Structural, Morphological, Optical and Gas Sensing Properties of Pure and Ce Doped SnO ₂ Thin Films Prepared by Jet Nebulizer Spray Pyrolysis (JNSP) Technique. <i>J. Mater. Sci. Mater. Electron.</i> 2017 , 28, 4577–4585, doi:10.1007/s10854-016-6094-9.
43	Sun, G.-J.; Lee, J.K.; Lee, W.I.; Dwivedi, R.P.; Lee, C.; Ko, T. Ethanol Sensing Properties and Dominant Sensing Mechanism of NiO-Decorated SnO ₂ Nanorod Sensors. <i>Electron. Mater. Lett.</i> 2017 , 13, 260–269, doi:10.1007/s13391-017-1719-6.
44	Tan, W.; Yu, Q.; Ruan, X.; Huang, X. Design of SnO ₂ -Based Highly Sensitive Ethanol Gas Sensor Based on Quasi Molecular-Cluster Imprinting Mechanism. <i>Sens. Actuators B Chem.</i> 2015 , 212, 47–54, doi:10.1016/j.snb.2015.01.035.
45	Tricoli, A.; Pratsinis, S.E. Dispersed Nanoelectrode Devices. <i>Nat. Nanotechnol.</i> 2010 , 5, 54–60, doi:10.1038/nnano.2009.349.
46	Van Hieu, N.; Kim, H.-R.; Ju, B.-K.; Lee, J.-H. Enhanced Performance of SnO ₂ Nanowires Ethanol Sensor by Functionalizing with La ₂ O ₃ . <i>Sens. Actuators B Chem.</i> 2008 , 133, 228–234, doi:10.1016/j.snb.2008.02.018.
47	Wang, B.; Sun, L.; Wang, Y. Template-Free Synthesis of Nanosheets-Assembled SnO ₂ Hollow Spheres for Enhanced Ethanol Gas Sensing. <i>Mater. Lett.</i> 2018 , 218, 290–294, doi:10.1016/j.matlet.2018.02.003.
48	Wang, B.; Wang, Y.; Lei, Y.; Xie, S.; Wu, N.; Gou, Y.; Han, C.; Shi, Q.; Fang, D. Vertical SnO ₂ Nanosheet@SiC Nanofibers with Hierarchical Architecture for High-Performance Gas Sensors. <i>J. Mater. Chem. C</i> 2016 , 4, 295–304, doi:10.1039/C5TC02792F.
49	Wang, C.; Cai, D.; Liu, B.; Li, H.; Wang, D.; Liu, Y.; Wang, L.; Wang, Y.; Li, Q.; Wang, T. Ethanol-Sensing Performance of Tin Dioxide Octahedral Nanocrystals with

	Exposed High-Energy {111} and {332} Facets. <i>J. Mater. Chem. A</i> 2014 , 2, 10623–10628, doi:10.1039/C4TA00844H.
50	Wang, Q.; Yao, N.; An, D.; Li, Y.; Zou, Y.; Lian, X.; Tong, X. Enhanced Gas Sensing Properties of Hierarchical SnO ₂ Nanoflower Assembled from Nanorods via a One-Pot Template-Free Hydrothermal Method. <i>Ceram. Int.</i> 2016 , 42, 15889–15896, doi:10.1016/j.ceramint.2016.07.062.
51	Wang, S.; Yu, W.; Cheng, C.; Zhang, T.; Ge, M.; Sun, Y.; Dai, N. Fabrication of Mesoporous SnO ₂ Nanocubes with Superior Ethanol Gas Sensing Property. <i>Mater. Res. Bull.</i> 2017 , 89, 267–272, doi:10.1016/j.materresbull.2017.02.010.
52	Wang, T.T.; Ma, S.Y.; Cheng, L.; Luo, J.; Jiang, X.H.; Jin, W.X. Preparation of Yb-Doped SnO ₂ Hollow Nanofibers with an Enhanced Ethanol–Gas Sensing Performance by Electrospinning. <i>Sens. Actuators B Chem.</i> 2015 , 216, 212–220, doi:10.1016/j.snb.2015.04.040.
53	Wang, Y.; Liu, C.; Wang, L.; Liu, J.; Zhang, B.; Gao, Y.; Sun, P.; Sun, Y.; Zhang, T.; Lu, G. Horseshoe-Shaped SnO ₂ with Annulus-like Mesoporous for Ethanol Gas Sensing Application. <i>Sens. Actuators B Chem.</i> 2017 , 240, 1321–1329, doi:10.1016/j.snb.2016.07.160.
54	Xiao, L.; Shu, S.; Liu, S. A Facile Synthesis of Pd-Doped SnO ₂ Hollow Microcubes with Enhanced Sensing Performance. <i>Sens. Actuators B Chem.</i> 2015 , 221, 120–126, doi:10.1016/j.snb.2015.06.099.
55	Xie, N.; Guo, L.; Chen, F.; Kou, X.; Wang, C.; Ma, J.; Sun, Y.; Liu, F.; Liang, X.; Gao, Y.; et al. Enhanced Sensing Properties of SnO ₂ Nanofibers with a Novel Structure by Carbonization. <i>Sens. Actuators B Chem.</i> 2018 , 271, 44–53, doi:10.1016/j.snb.2018.05.039.
56	Xu, M.-H.; Cai, F.-S.; Yin, J.; Yuan, Z.-H.; Bie, L.-J. Facile Synthesis of Highly Ethanol-Sensitive SnO ₂ Nanosheets Using Homogeneous Precipitation Method. <i>Sens. Actuators B Chem.</i> 2010 , 145, 875–878, doi:10.1016/j.snb.2010.01.002.
57	Xu, W.; Xia, L.; Ju, J.; Xi, P.; Cheng, B.; Liang, Y. Preparation and Low-Temperature Gas-Sensing Properties of SnO ₂ Ultra-Fine Fibers Fabricated by a Centrifugal Spinning Process. <i>J. Sol-Gel Sci. Technol.</i> 2016 , 78, 353–364, doi:10.1007/s10971-016-3962-y.
58	Xue, N.; Zhang, Q.; Zhang, S.; Zong, P.; Yang, F. Highly Sensitive and Selective Hydrogen Gas Sensor Using the Mesoporous SnO ₂ Modified Layers. <i>Sensors</i> 2017 , 17, 2351, doi:10.3390/s17102351.
59	Yan, S.; Liang, X.; Song, H.; Ma, S.; Lu, Y. Synthesis of Porous CeO ₂ -SnO ₂ Nanosheets Gas Sensors with Enhanced Sensitivity. <i>Ceram. Int.</i> 2018 , 44, 358–363, doi:10.1016/j.ceramint.2017.09.181.
60	Yang, F.; Guo, Z. Comparison of the Enhanced Gas Sensing Properties of Tin Dioxide Samples Doped with Different Catalytic Transition Elements. <i>J. Colloid Interface Sci.</i> 2015 , 448, 265–274, doi:10.1016/j.jcis.2015.02.045.
61	Yoon, J.-W.; Choi, S.H.; Kim, J.-S.; Jang, H.W.; Kang, Y.C.; Lee, J.-H. Trimodally Porous SnO ₂ Nanospheres with Three-Dimensional Interconnectivity and Size Tunability: A One-Pot Synthetic Route and Potential Application as an Extremely Sensitive Ethanol Detector. <i>NPG Asia Mater.</i> 2016 , 8, e244, doi:10.1038/am.2016.16.

62	Yu, X.; Zeng, W. Fabrication and Gas-Sensing Performance of Nanorod-Assembled SnO ₂ Nanostructures. <i>J. Mater. Sci. Mater. Electron.</i> 2016 , <i>27</i> , 7448–7453, doi:10.1007/s10854-016-4721-0.
63	Yue, L.; Ge, J.; Luo, G.; Bian, K.; Yin, C.; Guan, R.; Zhang, W.; Zhou, Z.; Wang, K.; Guo, X. A Facile Large-Scale Synthesis of Porous SnO ₂ by Bronze for Superior Lithium Storage and Gas Sensing Properties Through a Wet Chemical Reaction Strategy. <i>J. Electron. Mater.</i> 2018 , <i>47</i> , 2545–2556, doi:10.1007/s11664-018-6130-z.
64	Zeng, Q.; Cui, Y.; Zhu, L.; Yao, Y. Increasing Oxygen Vacancies at Room Temperature in SnO ₂ for Enhancing Ethanol Gas Sensing. <i>Mater. Sci. Semicond. Process.</i> 2020 , <i>111</i> , 104962, doi:10.1016/j.mssp.2020.104962.
65	Zeng, W.; He, Q.; Pan, K.; Wang, Y. Synthesis of Multifarious Hierarchical Flower-like SnO ₂ and Their Gas-Sensing Properties. <i>Phys. E Low-Dimens. Syst. Nanostructures</i> 2013 , <i>54</i> , 313–318, doi:10.1016/j.physe.2013.07.014.
66	Zeng, W.; Li, T.; Li, T.; Hao, J.; Li, Y. Template-Free Synthesis of Highly Ethanol-Response Hollow SnO ₂ Spheres Using Hydrothermal Process. <i>J. Mater. Sci. Mater. Electron.</i> 2015 , <i>26</i> , 1192–1197, doi:10.1007/s10854-014-2524-8.
67	Zeng, W.; Zhang, H.; Li, Y.; Chen, W.; Wang, Z. Hydrothermal Synthesis of Hierarchical Flower-like SnO ₂ Nanostructures with Enhanced Ethanol Gas Sensing Properties. <i>Mater. Res. Bull.</i> 2014 , <i>57</i> , 91–96, doi:10.1016/j.materresbull.2014.05.019.
68	Zhang, B.; Fu, W.; Meng, X.; Ruan, A.; Su, P.; Yang, H. Enhanced Ethanol Sensing Properties Based on Spherical-Coral-like SnO ₂ Nanorods Decorated with α -Fe ₂ O ₃ Nanocrystallites. <i>Sens. Actuators B Chem.</i> 2018 , <i>261</i> , 505–514, doi:10.1016/j.snb.2018.01.133.
69	Zhang, L.; Tong, R.; Ge, W.; Guo, R.; Shirsath, S.E.; Zhu, J. Facile One-Step Hydrothermal Synthesis of SnO ₂ Microspheres with Oxygen Vacancies for Superior Ethanol Sensor. <i>J. Alloys Compd.</i> 2020 , <i>814</i> , 152266, doi:10.1016/j.jallcom.2019.152266.
70	Zhang, R.; Jia, J.-B.; Cao, J.-L.; Wang, Y. SnO ₂ /Graphene Nanoplatelet Nanocomposites: Solid-State Method Synthesis With High Ethanol Gas-Sensing Performance. <i>Front. Chem.</i> 2018 , <i>6</i> , 337, doi:10.3389/fchem.2018.00337.
71	Zhang, Y.; He, X.; Li, J.; Miao, Z.; Huang, F. Fabrication and Ethanol-Sensing Properties of Micro Gas Sensor Based on Electrospun SnO ₂ Nanofibers. <i>Sens. Actuators B Chem.</i> 2008 , <i>132</i> , 67–73, doi:10.1016/j.snb.2008.01.006.
72	Zhao, R.; Wang, Z.; Zou, T.; Wang, Z.; Xing, X.; Yang, Y.; Wang, Y. ‘Green’ Prepare SnO ₂ Nanofibers by Shaddock Peels: Application for Detection of Volatile Organic Compound Gases. <i>J. Mater. Sci. Mater. Electron.</i> 2019 , <i>30</i> , 3032–3044, doi:10.1007/s10854-018-00582-5.
73	Zhao, T.; Qiu, P.; Fan, Y.; Yang, J.; Jiang, W.; Wang, L.; Deng, Y.; Luo, W. Hierarchical Branched Mesoporous TiO ₂ –SnO ₂ Nanocomposites with Well-Defined n–n Heterojunctions for Highly Efficient Ethanol Sensing. <i>Adv. Sci.</i> 2019 , <i>6</i> , 1902008, doi:10.1002/adv.201902008.
74	Zhou, Q.; Chen, W.; Li, J.; Tang, C.; Zhang, H. Nanosheet-Assembled Flower-like SnO ₂ Hierarchical Structures with Enhanced Gas-Sensing Performance. <i>Mater. Lett.</i> 2015 , <i>161</i> , 499–502, doi:10.1016/j.matlet.2015.09.010.

75	Zito, C.A.; Perfecto, T.M.; Volanti, D.P. Impact of Reduced Graphene Oxide on the Ethanol Sensing Performance of Hollow SnO ₂ Nanoparticles under Humid Atmosphere. <i>Sens. Actuators B Chem.</i> 2017 , <i>244</i> , 466–474, doi:10.1016/j.snb.2017.01.015.
76	Zito, C.A.; Perfecto, T.M.; Volanti, D.P. Palladium-Loaded Hierarchical Flower-like Tin Dioxide Structure as Chemosensor Exhibiting High Ethanol Response in Humid Conditions. <i>Adv. Mater. Interfaces</i> 2017 , <i>4</i> , 1700847, doi:10.1002/admi.201700847.