Publications

Journals

(1) **S. Das,** R. Kumar, J. Singh, and M. Kumar, "Fabrication of Microsensor for Detection of Low-Concentration Formaldehyde Gas in Formalin-Treated Fish," *IEEE Trans. Electron Devices*, vol. 67, no. 12, pp. 5710–5716, 2020, doi: 10.1109/TED.2020.3031874.

(2) **S. Das**, J. Singh and M. Kumar, "Fabrication of Fast and Reliable Pulse Laser-Ablated ZnO Nanoparticles-Based Formaldehyde Sensor," in *IEEE Transactions on Electron Devices*, vol. 68, no. 4, pp. 1872-1877, April 2021, doi: 10.1109/TED.2021.3058085.

(3) **S. Das**, S. Kumar, J. Singh, and M. Kumar, "Decoration of laser-ablated ZnO nanoparticles over sputtered deposited SnO_2 thin film based formaldehyde sensor," *Sensors Actuators B Chem.*, vol. 367, no. February, p. 132114, 2022, doi: 10.1016/j.snb.2022.132114.

(4) **S. Das**, A. Kumar, J. Singh, and M. Kumar, "Fabrication and modeling of laser ablated NiO nanoparticles decorated SnO_2 based formaldehyde sensor," *Sensors Actuators B Chem.*, vol. 387, no. March, p. 133824, 2023, doi: 10.1016/j.snb.2023.133824.

(5) **S. Das**, A. Kumar, A. Kumar, J. Singh, R. Jha, and M. Kumar, "UV Light Detection Using Resonance Frequency of Piezoelectric Quartz Crystal," *IEEE Trans. Electron Devices*, vol. 68, no. 6, pp. 2791–2795, 2021, doi: 10.1109/TED.2021.3072351.

.

References

Allouch, A., Guglielmino, M., Bernhardt, P., Serra, C. A., and Le Calvé, S., (2013), "Transportable, fast and high sensitive near real-time analyzers: Formaldehyde detection", *Sensors and Actuators, B: Chemical*, Vol.181, pp.551–558.

Baroncini, M., Placidi, P., Cardinali, G. C., and Scorzoni, A., (2004), "Thermal characterization of a microheater for micromachined gas sensors", *Sensors and Actuators, A: Physical*, Vol.115, No.1, pp.8–14.

Barsan, N., and Weimar, U., (2001a), "Conduction model of metal oxide gas sensors", *Journal of Electroceramics*, Vol.7, No.3, pp.143–167.

Barsan, N., and Weimar, U. D. O., (2001b), "Conduction Model of Metal Oxide Gas Sensors", *Journal of Electroceramics*, Vol.7, pp.143–167.

Barsan, N., and Weimar, U. D. O., (2002), "Conduction Model of Metal Oxide Gas Sensors", *Growth (Lakeland)*, pp.143–167.

Becker, T., Ahlers, S., Bosch-v.Braunmühl, C., Müller, G., and Kiesewetter, O., (2001), "Gas sensing properties of thin- and thick-film tin-oxide materials", *Sensors and Actuators, B: Chemical*, Vol.77, No.1–2, pp.55–61.

Bianchi, F., Careri, M., Musci, M., and Mangia, A., (2007), "Fish and food safety: Determination of formaldehyde in 12 fish species by SPME extraction and GC-MS analysis", *Food Chemistry*, Vol.100, No.3, pp.1049–1053.

Bíró, F., Hajnal, Z., Dücső, C., and Bársony, I., (2017), "The critical impact of temperature gradients on Pt filament failure", *Microelectronics Reliability*, Vol.78, pp.118–125.

Boutinguiza, M., Comesaña, R., Lusquiños, F., Riveiro, A., Del Val, J., and Pou, J., (2015), "Production of silver nanoparticles by laser ablation in open air", *Applied Surface Science*, Vol.336, pp.108–111.

Boutinguiza, M., Fernández-Arias, M., del Val, J., Buxadera-Palomero, J., Rodríguez, D., Lusquiños, F., Gil, F. J., and Pou, J., (2018), "Synthesis and deposition of silver nanoparticles on cp Ti by laser ablation in open air for antibacterial effect in dental implants", *Materials Letters*, Vol.231, pp.126–129.

Brilis, N., Romesis, P., Tsamakis, D., and Kompitsas, M., (2005), "Influence of pulsed laser deposition (PLD) parameters on the H_2 sensing properties of zinc oxide thin films", *Superlattices and Microstructures*, Vol.38, No.4–6, pp.283–290.

Castro-Hurtado, I., Herrán, J., Mandayo, G. G., and Castaño, E., (2011), "Studies of influence of structural properties and thickness of NiO thin films on formaldehyde detection", *Thin Solid Films*, Vol.520, No.3, pp.947–952.

Castro-Hurtado, I., Mandayo, G. G., and Castaño, E., (2013), "Conductometric formaldehyde gas sensors. A review: From conventional films to nanostructured materials", *Thin Solid Films*, Vol.548, pp.665–676.

Chang, X., Wu, X., Guo, Y., Zhao, Y., Zheng, J., and Li, X., (2018a), "$SnSO_4$ modified ZnO nanostructure for highly sensitive and selective formaldehyde detection", *Sensors and Actuators, B: Chemical*, Vol.255, pp.1153–1159.

Chang, X., Wu, X., Guo, Y., Zhao, Y., Zheng, J., and Li, X., (2018b), "$SnSO_4$ modified ZnO nanostructure for highly sensitive and selective formaldehyde detection", *Sensors and Actuators, B: Chemical*, Vol.255, pp.1153–1159.

Chau, C. F., and Melvin, T., (2012), "Design and fabrication of a quasi-ordered nanoporous silicon membrane suitable for thermally induced drug release", *Journal of Micromechanics and Microengineering*, Vol.22, No.8.

Chen, D., and Yuan, Y. J., (2015), "Thin-Film Sensors for Detection of Formaldehyde: A Review", *IEEE Sensors Journal*, Vol.15, No.12, pp.6749–6760.

Chen, Q., Tong, T., Longtin, J. P., Tankiewicz, S., Sampath, S., and Gambino, R. J., (2004), "Novel sensor fabrication using direct-write thermal spray and precision laser micromachining", *Journal of Manufacturing Science and Engineering, Transactions of the ASME*, Vol.126, No.4, pp.830–836.

Chung, P. R., Tzeng, C. T., Ke, M. T., and Lee, C. Y., (2013), "Formaldehyde gas sensors: A review", *Sensors (Switzerland)*, Vol.13, No.4, pp.4468–4484.

Cui, J., Shi, L., Xie, T., Wang, D., and Lin, Y., (2016), "UV-light illumination room temperature HCHO gas-sensing mechanism of ZnO with different nanostructures", *Sensors and Actuators, B: Chemical*, Vol.227, pp.220–226.

Das, S., and Jayaraman, V., (2014), "SnO_2: A comprehensive review on structures and gas sensors",

Progress in Materials Science, Vol.66, pp.112–255.
Das, S., Kumar, R., Singh, J., and Kumar, M., (2020), "Fabrication of Microsensor for Detection of Low-Concentration Formaldehyde Gas in Formalin-Treated Fish", *IEEE Transactions on Electron Devices*, Vol.67, No.12, pp.5710–5716.
Das, S., Kumar, S., Singh, J., and Kumar, M., (2022), "Decoration of laser-ablated ZnO nanoparticles over sputtered deposited SnO_2 thin film based formaldehyde sensor", *Sensors and Actuators B: Chemical*, Vol.367, No.February, pp.132114.
David, E. W., (1999), "Semiconducting oxides as gas-sensitive resistors", *Sensors and Actuators B: Chemical*, Vol.57, No.January, pp.1–16.
Deng, L., Ding, X., Zeng, D., Tian, S., Li, H., and Xie, C., (2012), "Visible-light activate mesoporous WO_3 sensors with enhanced formaldehyde-sensing property at room temperature", *Sensors and Actuators, B: Chemical*, Vol.163, No.1, pp.260–266.
Dey, A., (2018), "Semiconductor metal oxide gas sensors: A review", *Materials Science and Engineering B: Solid-State Materials for Advanced Technology*, Vol.229, No.November 2017, pp.206–217.
Din, S. U., Haq, M. U., Sajid, M., Khatoon, R., Chen, X., Li, L., Zhang, M., and Zhu, L., (2020), "Development of high-performance sensor based on NiO/SnO_2heterostructures to study sensing properties towards various reducing gases", *Nanotechnology*, Vol.31, No.39.
Dirksen, J. A., Duval, K., and Ring, T. A., (2001), "NiO thin-film formaldehyde gas sensor", *Sensors and Actuators, B: Chemical*, Vol.80, No.2, pp.106–115.
Dong, C., Li, Q., Chen, G., Xiao, X., and Wang, Y., (2015), "Enhanced formaldehyde sensing performance of 3D hierarchical porous structure Pt-functionalized NiO via a facile solution combustion synthesis", *Sensors and Actuators, B: Chemical*, Vol.220, pp.171–179.
Du, H., Wang, J., Su, M., Yao, P., Zheng, Y., and Yu, N., (2012), "Formaldehyde gas sensor based on SnO_2/In_2O_3 hetero-nanofibers by a modified double jets electrospinning process", *Sensors and Actuators, B: Chemical*, Vol.166–167, pp.746–752.
Eranna, G., Joshi, B. C., Runthala, D. P., and Gupta, R. P., (2004), "Oxide materials for development of integrated gas sensors - A comprehensive review", *Critical Reviews in Solid State and Materials Sciences*, Vol.29, No.3–4, pp.111–188.
Fang, J., Zhu, Y., Wu, D., Zhang, C., Xu, S., Xiong, D., Yang, P., Wang, L., and Chu, P. K., (2017), "Gas sensing properties of NiO/SnO_2 heterojunction thin film", *Sensors and Actuators, B: Chemical*, Vol.252, pp.1163–1168.
Fernández-Arias, M., Boutinguiza, M., Del Val, J., Riveiro, A., Rodríguez, D., Arias-González, F., Gil, J., and Pou, J., (2020), "Fabrication and deposition of copper and copper oxide nanoparticles by laser ablation in open air", *Nanomaterials*, Vol.10, No.2.
Gaca, K. Z., Parkinson, J. A., Lue, L., and Sefcik, J., (2014), "Equilibrium speciation in moderately concentrated formaldehyde-methanol- water solutions investigated using 13C and 1H nuclear magnetic resonance spectroscopy", *Industrial and Engineering Chemistry Research*, Vol.53, No.22, pp.9262–9271.
Giberti, A., Gaiardo, A., Fabbri, B., Gherardi, S., Guidi, V., Malagù, C., Bellutti, P., Zonta, G., Casotti, D., and Cruciani, G., (2016), "Tin(IV) sulfide nanorods as a new gas sensing material", *Sensors and Actuators, B: Chemical*, Vol.223, pp.827–833.
Gondal, M. A., Drmosh, Q. A., and Saleh, T. A., (2010), "Preparation and characterization of SnO_2 nanoparticles using high power pulsed laser", *Applied Surface Science*, Vol.256, No.23, pp.7067–7070.
Gondal, M. A., Saleh, T. A., and Drmosh, Q. A., (2012), "Synthesis of nickel oxide nanoparticles using pulsed laser ablation in liquids and their optical characterization", *Applied Surface Science*, Vol.258, No.18, pp.6982–6986.
Gondal, M. A., Yamani, Z. H., Drmosh, Q. A., and Rashid, A., (2009), "Synthesis of nanostructured ZnO and ZnO_2 by laser ablation process using third harmonic of Nd:YAG laser", *International Journal of Nanoparticles*, Vol.2, No.1–6, pp.119–128.
Gu, C., Cui, Y., Wang, L., Sheng, E., Shim, J. J., and Huang, J., (2017), "Synthesis of the porous NiO/SnO_2 microspheres and microcubes and their enhanced formaldehyde gas sensing performance", *Sensors and Actuators, B: Chemical*, Vol.241, pp.298–307.
Guo, J., Zhang, J., Zhu, M., Ju, D., Xu, H., and Cao, B., (2014), "High-performance gas sensor based on ZnO nanowires functionalized by Au nanoparticles", *Sensors and Actuators, B: Chemical*, Vol.199, pp.339–345.
Haupt, O., Siegel, F., Schoonderbeek, A., Richter, L., Kling, R., and Ostendorf, A., (2007), "Laser dicing of silicon: Comparison of ablation mechanisms with a novel technology of thermally induced stress", *Journal of Laser Micro Nanoengineering*, Vol.3, No.3, pp.135–140.
He, C., Sasaki, T., Shimizu, Y., and Koshizaki, N., (2008), "Synthesis of ZnO nanoparticles using

nanosecond pulsed laser ablation in aqueous media and their self-assembly towards spindle-like ZnO aggregates", *Applied Surface Science*, Vol.254, No.7, pp.2196–2202.

Hongseok Choi, X. L., (2007), "Fabrication and application of micro thin film thermocouples for transient temperature measurement in nanosecond pulsed laser micromachining of nickel", *Sensors and Actuators, A: Physical*, Vol.136, No.1, pp.118–124.

Hu, J., Yang, J., Wang, W., Xue, Y., Sun, Y., Li, P., Lian, K., Zhang, W., Chen, L., Shi, J., and Chen, Y., (2018), "Synthesis and gas sensing properties of NiO/SnO_2 hierarchical structures toward ppb-level acetone detection", *Materials Research Bulletin*, Vol.102, pp.294–303.

Jian, Y., Hu, W., Zhao, Z., Cheng, P., Haick, H., Yao, M., and Wu, W., (2020), "*Gas Sensors Based on Chemi-Resistive Hybrid Functional Nanomaterials*",*Nano-Micro Letters* (Vol. 12). Springer Singapore.

Jin, C., Choi, M. S., Lee, K. H., and Choi, S. W., (2021), "Gas sensing behavior of p-NiO/n-ZnO composite nanofibers depending on varying p-NiO content: Selectivity and humidity-independence for oxidizing and reducing gas molecules", *Sensors and Actuators B: Chemical*, Vol.349, No.June, pp.130813.

Jing Cao, Ziying Wang, Rui Wang, Sen Liu, Teng Fei, L. W. and T. Z., (2015), "Synthesis of core-shell α-Fe_2O_3@NiO nanofibers with a hollow structure and their enhanced HCHO sensing properties", *J. Mater. Chem. C*, Vol.3, pp.10715–10722.

Joshi, N., Hayasaka, T., Liu, Y., Liu, H., Oliveira, O. N., and Lin, L., (2018), "A review on chemiresistive room temperature gas sensors based on metal oxide nanostructures, graphene and 2D transition metal dichalcogenides", *Microchimica Acta*, Vol.185, No.4.

Ju, D., Xu, H., Qiu, Z., Guo, J., Zhang, J., and Cao, B., (2014), "Highly sensitive and selective triethylamine-sensing properties of nanosheets directly grown on ceramic tube by forming NiO/ZnO PN heterojunction", *Sensors and Actuators, B: Chemical*, Vol.200, pp.288–296.

Ju, D., Xu, H., Xu, Q., Gong, H., Qiu, Z., Guo, J., Zhang, J., and Cao, B., (2015), "High triethylamine-sensing properties of NiO/SnO_2 hollow sphere P-N heterojunction sensors", *Sensors and Actuators, B: Chemical*, Vol.215, pp.39–44.

Jung, Y., (2014), "Chemically synthesized heterostructures of two-dimensional molybdenum/tungsten-based dichalcogenides with vertically aligned layers.", *ACS Nano*, Vol.8, No.9, pp.9550–9557.

Kawamura, K., Kerman, K., Fujihara, M., Nagatani, N., Hashiba, T., and Tamiya, E., (2005), "Development of a novel hand-held formaldehyde gas sensor for the rapid detection of sick building syndrome", *Sensors and Actuators, B: Chemical*, Vol.105, No.2, pp.495–501.

Khamfoo, K., Inyawilert, K., Wisitsoraat, A., Tuantranont, A., Phanichphant, S., and Liewhiran, C., (2020), "Formaldehyde sensor based on FSP-made AgOx-doped SnO_2 nanoparticulate sensing films", *Sensors and Actuators, B: Chemical*, Vol.309.

Kim, H., Piqué, A., Horwitz, J. S., Murata, H., Kafafi, Z. H., Gilmore, C. M., and Chrisey, D. B., (2000), "Effect of aluminum doping on zinc oxide thin films grown by pulsed laser deposition for organic light-emitting devices", *Thin Solid Films*, Vol.377–378, pp.798–802.

Kołodziejska, I., Niecikowska, C., and Sikorski, Z. E., (1994), "Dimethylamine and formaldehyde in cooked squid (Illex argentinus) muscle extract and mantle", *Food Chemistry*, Vol.50, No.3, pp.281–283.

Korotcenkov, G., (2007), "Metal oxides for solid-state gas sensors: What determines our choice?", *Materials Science and Engineering B: Solid-State Materials for Advanced Technology*, Vol.139, No.1, pp.1–23.

Korotcenkov, G., and Cho, B. K., (2014), "Engineering approaches to improvement of conductometric gas sensor parameters. Part 2: Decrease of dissipated (consumable) power and improvement stability and reliability", *Sensors and Actuators, B: Chemical*, Vol.198, pp.316–341.

Kumar, R., Goel, N., Agrawal, A. V., Raliya, R., Rajamani, S., Gupta, G., Biswas, P., Kumar, M., and Kumar, M., (2019), "Boosting Sensing Performance of Vacancy-Containing Vertically Aligned MoS2 Using rGO Particles", *IEEE Sensors Journal*, Vol.19, No.22, pp.10214–10220.

Lee, C. Y., Chiang, C. M., Wang, Y. H., and Ma, R. H., (2007), "A self-heating gas sensor with integrated NiO thin-film for formaldehyde detection", *Sensors and Actuators, B: Chemical*, Vol.122, No.2, pp.503–510.

Lee, C. Y., and Strano, M. S., (2005), "Understanding the dynamics of signal transduction for adsorption of gases and vapors on carbon nanotube sensors", *AIChE Annual Meeting, Conference Proceedings*, , No.13, pp.14039.

Lei, G., Lou, C., Liu, X., Xie, J., Li, Z., Zheng, W., and Zhang, J., (2021), "Thin films of tungsten oxide materials for advanced gas sensors", *Sensors and Actuators, B: Chemical*, Vol.341, No.April, pp.129996.

Li, G., Cheng, Z., Xiang, Q., Yan, L., Wang, X., and Xu, J., (2019a), "Bimetal PdAu decorated SnO_2 nanosheets based gas sensor with temperature-dependent dual selectivity for detecting formaldehyde and acetone", *Sensors and Actuators, B: Chemical*, Vol.283, pp.590–601.

Li, N., Fan, Y., Shi, Y., Xiang, Q., Wang, X., and Xu, J., (2019b), "A low temperature formaldehyde gas

sensor based on hierarchical SnO/SnO_2 nano-flowers assembled from ultrathin nanosheets: Synthesis, sensing performance and mechanism", *Sensors and Actuators, B: Chemical*, Vol.294, pp.106–115.

Li, X., Wang, J., Xie, D., Xu, J., Dai, R., Xiang, L., Zhu, H., and Jiang, Y., (2015a), "Reduced graphene oxide/hierarchical flower-like zinc oxide hybrid films for room temperature formaldehyde detection", *Sensors and Actuators, B: Chemical*, Vol.221, No.2, pp.1290–1298.

Li, X., Wang, J., Xie, D., Xu, J., Xia, Y., Li, W., Xiang, L., Li, Z., Xu, S., and Komarneni, S., (2017a), "Flexible room-temperature formaldehyde sensors based on rGO film and rGo/MoS_2 hybrid film", *Nanotechnology*, Vol.28, No.32.

Li, Y., Chen, N., Deng, D., Xing, X., Xiao, X., and Wang, Y., (2017b), "Formaldehyde detection: SnO_2 microspheres for formaldehyde gas sensor with high sensitivity, fast response/recovery and good selectivity", *Sensors and Actuators, B: Chemical*, Vol.238, pp.264–273.

Li, Z., Huang, Y., Zhang, S., Chen, W., Kuang, Z., Ao, D., Liu, W., and Fu, Y., (2015b), "A fast response & recovery H_2S gas sensor based on α-Fe_2O_3 nanoparticles with ppb level detection limit", *Journal of Hazardous Materials*, Vol.300, pp.167–174.

Li, Z., Li, H., Wu, Z., Wang, M., Luo, J., Torun, H., Hu, P., Yang, C., Grundmann, M., Liu, X., and Fu, Y., (2019c), "Advances in designs and mechanisms of semiconducting metal oxide nanostructures for high-precision gas sensors operated at room temperature", *Materials Horizons*, Vol.6, No.3, pp.470–506.

Li, Z., Liu, X., Zhou, M., Zhang, S., Cao, S., Lei, G., Lou, C., and Zhang, J., (2021), "Plasma-induced oxygen vacancies enabled ultrathin ZnO films for highly sensitive detection of triethylamine", *Journal of Hazardous Materials*, Vol.415, No.December 2020, pp.125757.

Li, Z., Zhao, Q., Fan, W., and Zhan, J., (2011a), "Porous SnO_2 nanospheres as sensitive gas sensors for volatile organic compounds detection", *Nanoscale*, Vol.3, No.4, pp.1646–1652.

Li, Z., Zhao, Q., Fan, W., and Zhan, J., (2011b), "Porous SnO_2 nanospheres as sensitive gas sensors for volatile organic compounds detection", *Nanoscale*, Vol.3, No.4, pp.1646–1652.

Lin, S., Li, D., Wu, J., Li, X., and Akbar, S. A., (2011), "A selective room temperature formaldehyde gas sensor using TiO_2 nanotube arrays", *Sensors and Actuators, B: Chemical*, Vol.156, No.2, pp.505–509.

Liu, X., Cheng, S., Liu, H., Hu, S., Zhang, D., and Ning, H., (2012), "A survey on gas sensing technology", *Sensors (Switzerland)*, Vol.12, No.7, pp.9635–9665.

Liu, X., Du, D., and Mourou, G., (1997), "Laser ablation and micromachining with ultrashort laser pulses", *IEEE Journal of Quantum Electronics*, Vol.33, No.10, pp.1706–1716.

Lou, C., Yang, C., Zheng, W., Liu, X., and Zhang, J., (2021), "Atomic layer deposition of ZnO on SnO_2 nanospheres for enhanced formaldehyde detection", *Sensors and Actuators, B: Chemical*, Vol.329, No.July 2020, pp.129218.

Lu, Y., Meyyappan, M., and Li, J., (2011), "A carbon-nanotube-based sensor array for formaldehyde detection", *Nanotechnology*, Vol.22, No.5.

Meixner, H., Gerblinger, J., Lampe, U., and Fleischer, M., (1995), "Thin-film gas sensors based on semiconducting metal oxides", *Sensors and Actuators: B. Chemical*, Vol.23, No.2–3, pp.119–125.

Mele, L., Santagata, F., Iervolino, E., Mihailovic, M., Rossi, T., Tran, A. T., Schellevis, H., Creemer, J. F., and Sarro, P. M., (2012), "A molybdenum MEMS microhotplate for high-temperature operation", *Sensors and Actuators, A: Physical*, Vol.188, pp.173–180.

Meng, D., Liu, D., Wang, G., Shen, Y., San, X., Li, M., and Meng, F., (2018a), "Low-temperature formaldehyde gas sensors based on NiO-SnO_2 heterojunction microflowers assembled by thin porous nanosheets", *Sensors and Actuators, B: Chemical*, Vol.273, No.January, pp.418–428.

Meng, D., Liu, D., Wang, G., Shen, Y., San, X., Li, M., and Meng, F., (2018b), "Low-temperature formaldehyde gas sensors based on NiO-SnO_2 heterojunction microflowers assembled by thin porous nanosheets", *Sensors and Actuators, B: Chemical*, Vol.273, pp.418–428.

Meng, D., Liu, D., Wang, G., Shen, Y., San, X., Li, M., and Meng, F., (2018c), "Low-temperature formaldehyde gas sensors based on NiO-SnO_2 heterojunction microflowers assembled by thin porous nanosheets", *Sensors and Actuators, B: Chemical*, Vol.273, No.June, pp.418–428.

Miller, T. A., Bakrania, S. D., Perez, C., and Wooldridge, M. S., (2006), "Nanostructured Tin Dioxide Materials for Gas Sensor Applications", *Functional Materials*, Vol.5, pp.1–24.

Nanoparticles-based, L. Z., (2021), "Fabrication of Fast and Reliable Pulse", Vol.68, No.4, pp.1872–1877.

Nedialkov, N. N., Imamova, S. E., and Atanasov, P. A., (2004), "Ablation of metals by ultrashort laser pulses", *Journal of Physics D: Applied Physics*, Vol.37, No.4, pp.638–643.

Özgür, Ü., Alivov, Y. I., Liu, C., Teke, A., Reshchikov, M. A., Doğan, S., Avrutin, V., Cho, S. J., and Morko, H., (2005), "A comprehensive review of ZnO materials and devices", *Journal of Applied Physics*, Vol.98, No.4, pp.1–103.

Pascariu, P., Airinei, A., Olaru, N., Petrila, I., Nica, V., Sacarescu, L., and Tudorache, F., (2016), "Microstructure, electrical and humidity sensor properties of electrospun NiO-SnO_2 nanofibers", *Sensors and Actuators, B: Chemical*, Vol.222, pp.1024–1031.

Pearton, S. J., Norton, D. P., Ip, K., Heo, Y. W., and Steiner, T., (2005), "Recent progress in processing and properties of ZnO", *Progress in Materials Science*, Vol.50, No.3, pp.293–340.

Puigcorbe, J., (n.d.), "Thermal and mechanical analysis of micromachined gas sensors", Vol.548.

Qi, G., Zhao, S., and Yuan, Z., (2013), "From function-guided assembly of a lotus leaf-like ZnO nanostructure to a formaldehyde gas-sensing application", *Sensors and Actuators, B: Chemical*, Vol.184, pp.143–149.

Rao, L. L. R., Singha, M. K., Subramaniam, K. M., Jampana, N., and Asokan, S., (2017), "Molybdenum Microheaters for MEMS-Based Gas Sensor Applications: Fabrication, Electro-Thermo-Mechanical and Response Characterization", *IEEE Sensors Journal*, Vol.17, No.1, pp.22–29.

Ren, H., Zhao, W., Wang, L., Ryu, S. O., and Gu, C., (2015), "Preparation of porous flower-like SnO_2 micro/nano structures and their enhanced gas sensing property", *Journal of Alloys and Compounds*, Vol.653, pp.611–618.

Ristoscu, C., Caiteanu, D., Prodan, G., Socol, G., Grigorescu, S., Axente, E., Stefan, N., Ciupina, V., Aldica, G., and Mihailescu, I. N., (2007), "Structural and optical characterization of undoped, doped, and clustered ZnO thin films obtained by PLD for gas sensing applications", *Applied Surface Science*, Vol.253, No.15, pp.6499–6503.

Rizvi, N. H., (2003), "Femtosecond laser micromachining : Current status and applications", *Glass*, Vol.50, No.50, pp.107–112.

Scorzoni, A., Caputo, D., Petrucci, G., Placidi, P., Zampolli, S., De Cesare, G., Tavernelli, M., and Nascetti, A., (2015), "Design and experimental characterization of thin film heaters on glass substrate for Lab-on-Chip applications", *Sensors and Actuators, A: Physical*, Vol.229, pp.203–210.

Semancik, S., Cavicchi, R. E., Wheeler, M. C., Tiffany, J. E., Poirier, G. E., Walton, R. M., Suehle, J. S., Panchapakesan, B., and DeVoe, D. L., (2001), "Microhotplate platforms for chemical sensor research", *Sensors and Actuators, B: Chemical*, Vol.77, No.1–2, pp.579–591.

Shao, S., Kim, H. W., Kim, S. S., Chen, Y., and Lai, M., (2020), "NGQDs modified nanoporous TiO_2/graphene foam nanocomposite for excellent sensing response to formaldehyde at high relative humidity", *Applied Surface Science*, Vol.516, No.February, pp.145932.

Simon, I., Bârsan, N., Bauer, M., and Weimar, U., (2001), "Micromachined metal oxide gas sensors: Opportunities to improve sensor performance", *Sensors and Actuators, B: Chemical*, Vol.73, No.1, pp.1–26.

Sukunta, J., Wisitsoraat, A., Tuantranont, A., Phanichphant, S., and Liewhiran, C., (2018), "WO_3 nanotubes−SnO_2 nanoparticles heterointerfaces for ultrasensitive and selective NO_2 detections", *Applied Surface Science*, Vol.458, No.July, pp.319–332.

Surajit Das , Jitendra Singh, and M. K., (2021), "Fabrication of Fast and Reliable Pulse Laser-Ablated ZnO Nanoparticles-Based Formaldehyde Sensor", *IEEE TRANSACTIONS ON ELECTRON DEVICES*, Vol.68, No.4, pp.1872–1877.

Syed Z. Ali, (2008), "Tungsten-Based SOI Microhotplates for Smart Gas Sensors", *JOURNAL OF MICROELECTROMECHANICAL SYSTEMS*, Vol.17, No.6.

Tang, W., and Wang, J., (2016), "1D NiO-SnO_2 Heterojunction Nanofibers as Acetone Sensor", *KnE Materials Science*, Vol.1, No.1, pp.172.

Tian, S., Zhang, Y., Zeng, D., Wang, H., Li, N., Xie, C., Pan, C., and Zhao, X., (2015), "Surface doping of la ions into ZnO nanocrystals to lower the optimal working temperature for HCHO sensing properties", *Physical Chemistry Chemical Physics*, Vol.17, No.41, pp.27437–27445.

Tiemann, M., (2007), "Porous metal oxides as gas sensors", *Chemistry - A European Journal*, Vol.13, No.30, pp.8376–8388.

Tonezzer, M., Le, D. T. T., Iannotta, S., and Van Hieu, N., (2018), "Selective discrimination of hazardous gases using one single metal oxide resistive sensor", *Sensors and Actuators, B: Chemical*, Vol.277, No.April, pp.121–128.

Villanueva, Y. Y., Liu, D. R., and Cheng, P. T., (2006), "Pulsed laser deposition of zinc oxide", *Thin Solid Films*, Vol.501, No.1–2, pp.366–369.

Vuong, N. M., Kim, D., and Kim, H., (2015), "Surface gas sensing kinetics of a WO_3 nanowire sensor: Part 1 - Oxidizing gases", *Sensors and Actuators, B: Chemical*, Vol.220, pp.932–941.

Wang, L., Dou, H., Li, F., Deng, J., Lou, Z., and Zhang, T., (2013), "Controllable and enhanced HCHO sensing performances of different-shelled ZnO hollow microspheres", *Sensors and Actuators, B: Chemical*, Vol.183, pp.467–473.

Wang, N., Wang, X., Jia, Y., Li, X., Yu, J., and Ding, B., (2014), "Electrospun nanofibrous chitosan

membranes modified with polyethyleneimine for formaldehyde detection", *Carbohydrate Polymers*, Vol.108, No.1, pp.192–199.
Wang, S., Cui, X., and Fang, G., (2007), "Rapid determination of formaldehyde and sulfur dioxide in food products and Chinese herbals", *Food Chemistry*, Vol.103, No.4, pp.1487–1493.
Wang, X., Si, Y., Wang, J., Ding, B., Yu, J., and Al-Deyab, S. S., (2012), "A facile and highly sensitive colorimetric sensor for the detection of formaldehyde based on electro-spinning/netting nano-fiber/nets", *Sensors and Actuators, B: Chemical*, Vol.163, No.1, pp.186–193.
Wang, Z., Zhou, H., Han, D., and Gu, F., (2017), "Electron compensation in p-type 3DOM NiO by Sn doping for enhanced formaldehyde sensing performance", *Journal of Materials Chemistry C*, Vol.5, No.13, pp.3254–3263.
Wetchakun, K., Samerjai, T., Tamaekong, N., Liewhiran, C., Siriwong, C., Kruefu, V., Wisitsoraat, A., Tuantranont, A., and Phanichphant, S., (2011), "Semiconducting metal oxides as sensors for environmentally hazardous gases", *Sensors and Actuators, B: Chemical*, Vol.160, No.1, pp.580–591.
Wu, G., Zhang, J., Wang, X., Liao, J., Xia, H., Akbar, S. A., Li, J., Lin, S., Li, X., and Wang, J., (2012), "Hierarchical structured TiO_2 nano-tubes for formaldehyde sensing", *Ceramics International*, Vol.38, No.8, pp.6341–6347.
Xiao, X., Xing, X., Han, B., Deng, D., Cai, X., and Wang, Y., (2015), "Enhanced formaldehyde sensing properties of SnO_2 nanorods coupled with Zn_2SnO_4", *RSC Advances*, Vol.5, No.53, pp.42628–42636.
Xie, C., Xiao, L., Hu, M., Bai, Z., Xia, X., and Zeng, D., (2010a), "Fabrication and formaldehyde gas-sensing property of ZnO-MnO2 coplanar gas sensor arrays", *Sensors and Actuators, B: Chemical*, Vol.145, No.1, pp.457–463.
Xie, C., Xiao, L., Hu, M., Bai, Z., Xia, X., and Zeng, D., (2010b), "Fabrication and formaldehyde gas-sensing property of ZnO-MnO_2 coplanar gas sensor arrays", *Sensors and Actuators, B: Chemical*, Vol.145, No.1, pp.457–463.
Xing, X., Xiao, X., Wang, L., and Wang, Y., (2017), "Highly sensitive formaldehyde gas sensor based on hierarchically porous Ag-loaded ZnO heterojunction nanocomposites", *Sensors and Actuators, B: Chemical*, Vol.247, pp.797–806.
Xu, K., Zeng, D., Tian, S., Zhang, S., and Xie, C., (2014), "Hierarchical porous SnO_2 micro-rods topologically transferred from tin oxalate for fast response sensors to trace formaldehyde", *Sensors and Actuators, B: Chemical*, Vol.190, pp.585–592.
Xu, Q., Ju, D., Zhang, Z., Yuan, S., Zhang, J., Xu, H., and Cao, B., (2016), "Near room-temperature triethylamine sensor constructed with CuO/ZnO P-N heterostructural nanorods directly on flat electrode", *Sensors and Actuators, B: Chemical*, Vol.225, pp.16–23.
Ye, Z., Tai, H., Xie, T., Yuan, Z., Liu, C., and Jiang, Y., (2016), "Room temperature formaldehyde sensor with enhanced performance based on reduced graphene oxide/titanium dioxide", *Sensors and Actuators, B: Chemical*, Vol.223, pp.149–156.
Yi, X., Lai, J., Liang, H., and Zhai, X., (2011), "Fabrication of a MEMS micro-hotplate", *Journal of Physics: Conference Series*, Vol.276, No.1.
Yu, H., Li, J., Li, Z., Tian, Y., and Yang, Z., (2019a), "Enhanced formaldehyde sensing performance based on Ag@WO_3 2D nanocomposite", *Powder Technology*, Vol.343, pp.1–10.
Yu, H., Li, J., Li, Z., Tian, Y., and Yang, Z., (2019b), "Enhanced formaldehyde sensing performance based on Ag@WO_3 2D nanocomposite", *Powder Technology*, Vol.343, pp.1–10.
Zhang, D., Liu, J., Jiang, C., Liu, A., and Xia, B., (2017), "Quantitative detection of formaldehyde and ammonia gas via metal oxide-modified graphene-based sensor array combining with neural network model", *Sensors and Actuators, B: Chemical*, Vol.240, pp.55–65.
Zhang, G., Han, X., Bian, W., Zhan, J., and Ma, X., (2016), "Facile synthesis and high formaldehyde-sensing performance of NiO-SnO_2 hybrid nanospheres", *RSC Advances*, Vol.6, No.5, pp.3919–3926.
Zhang, K. L., Chou, S. K., and Ang, S. S., (2007), "Fabrication, modeling and testing of a thin film Au/Ti microheater", *International Journal of Thermal Sciences*, Vol.46, No.6, pp.580–588.
Zhang, W. H., and Zhang, W. De, (2008), "Fabrication of SnO_2-ZnO nanocomposite sensor for selective sensing of trimethylamine and the freshness of fishes", *Sensors and Actuators, B: Chemical*, Vol.134, No.2, pp.403–408.
Zheng, Y., Wang, J., and Yao, P., (2011), "Formaldehyde sensing properties of electrospun NiO-doped SnO_2 nanofibers", *Sensors and Actuators, B: Chemical*, Vol.156, No.2, pp.723–730.
Zhu, L. Y., Yuan, K., Yang, J. G., Ma, H. P., Wang, T., Ji, X. M., Feng, J. J., Devi, A., and Lu, H. L., (2019a), "Fabrication of heterostructured p-CuO/n-SnO_2 core-shell nanowires for enhanced sensitive and selective formaldehyde detection", *Sensors and Actuators, B: Chemical*, Vol.290, No.March, pp.233–241.
Zhu, L. Y., Yuan, K., Yang, J. G., Ma, H. P., Wang, T., Ji, X. M., Feng, J. J., Devi, A., and Lu, H. L., (2019b), "Fabrication of heterostructured p-CuO/n-SnO_2 core-shell nanowires for enhanced sensitive and

selective formaldehyde detection", *Sensors and Actuators, B: Chemical*, Vol.290, No.January, pp.233–241.