Multi-array High-Resolution Metal Oxide Chemical Sensor

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Multi-array gas sensor has aroused as an effective mean to detect complex mixtures of gases due to its property. However, in order to design a successful multi-array gas sensor, it must not only contain a sensitivity and selectivity, but also a simple identical methodology to create various types of channels for each preference. Here, multi-array gas sensor to distinguish various types of gases including similar one like volatile organic compounds (VOCs) is rationally designed via unique lithographic technology that can encompass numerous metal oxides without additional process. Using multi-array metal oxide gas sensor (CuO, NiO, SnO2 and other MOS) and PCA data analysis process, it could successfully discriminate seven gases (Toluene, Hexane, Nitrogen Monoxide, Ethanol, Acetone, Propanal, and Ammonia) with high variance (large PC1 values range 40). More importantly, it was created through same methodology, giving very efficient means to design specific sensor with high aspect ratio (~25) for any multi-array sensor system. This work will guide the possibilities of developing specific and unique set of multi-array sensor for each specific purpose.