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High-performance gas sensors with temperature measurement

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There are a number of gas ionization sensors using carbon nanotubes as cathode or anode. Unfortunately, their applications are greatly limited by their multi-valued sensitivity, one output value corresponding to several measured concentration values. Here we describe a triple-electrode structure featuring two electric fields with opposite directions, which enable us to overcome the multi-valued sensitivity problem at 1 atm in a wide range of gas concentrations. We used a carbon nanotube array as the

first electrode, and the two electric fields between the upper and the lower interelectrode gaps were designed to extract positive ions generated in the lower gap, hence significantly reduced positive ion bombardment on the nanotube electrode, which allowed us to maintain a high electric field near the nanotube tips, leading to a single-valued sensitivity and a long nanotube life. We have demonstrated detection of various gases and simultaneously monitoring temperature and a potential for applications.

Biography

Yong Zhang received Bachelor, Master and Doctor Degree from Xi'an Jiaotong University, respectively. She is a professor in the School of Electrical Engineering of Xi'an Jiaotong University, a fixed member of the State Key Lab of Electrical Institute and Power Equipment, a senior member of IEEE, and an expert committee member of Energy Equipment of China Energy Society. She has published 43 papers in international well-known publications (Scientific Reports of the Nature Publishing Group, Sensors and Actuators B: Chemical, and so on). 26 patents have been authorized and 7 patents have been accepted by the Patent Office of China.

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