The Application of General MOS Gas Sensors for Discriminating Formalin Content

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Abstract	This paper describes the application of Metal Oxide Semiconductor (MOS) gas sensors which are intrinsically designed to sense volatile compounds for measuring the vapor of formalin. We utilized 7 commercial MOS gas sensors (namely TGS-2600, TGS-2602, TGS-2620, TGS-813, MQ-137, MQ-135, and MQ-5) to sense formalin in certain concentrations and their presence in meat. We built a static headspace system to measure the vapor of formalin. The sensor chamber is 540-cm3, made from 5 mm acrylic. The output of MOS (Sensitivity ratio) is acquired into computer using an Arduino-based interface. We tested 3 concentrations of formalin (10%, 20% and 30%) and their presence in meat. We found that individually each sensor provides proportional response to formalin concentrations, and for their presence in meat as well. The Principle Component Analysis (PCA) method is used to show performance of the array MOS sensor in discriminating the formalin contents. The PCA result shows that by using two PCs (holding most 96% data), it can clearly distinguish the three formalin contents. However the array sensors just can discriminate clearly between meat containing formalin and those not. The success rate of discrimination the formalin contents in meat is 91.7%.
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