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Gas Sensors Based on Nanosized-Zeolite Films to Identify Dimethylmethylphosphonate

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Gas sensors have been developed using ZSM-5 zeolite films immobilized on a quartz crystal microbalance (QCM). Frequency shifts with different concentrations of nerve agent simulant dimethylmethylphosphonate (DMMP) are measured. The frequency shifts with time at 1 ppm, 5 ppm and 20 ppm DMMP are examined. A minimum detectable concentration of 1 ppm DMMP has been obtained in N_2 at 293 K. In order to improve the selectivity of the sensor to the DMMP from other organic gases, different pore size zeolite films such as ZSM-5 zeolite and Ag^+-modified ZSM-5 zeolite are studied. The frequency shifts of the films to acetone and ethanol at 1 ppm concentration are observed. Using principle component analysis, we can easily identify and quantify these testing gases.

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