

QUARTZ CRYSTAL MICROBALANCE GAS SENSOR FOR DETECTION OF VOLATILE ORGANIC COMPOUNDS USING TITANIUM DIOXIDE COATED WITH DYE-PORPHYRIN

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ABSTRACT

A bulk acoustic sensor system was fabricated and used to detect some volatile organic compounds namely ethanol, acetone, cyclohexane, toluene, o-xylene and 2-propanol. The sensing sensitivity was based on the changes of the quartz crystal microbalance (QCM) frequency upon exposure towards the vapors. In order to improve the sensing sensitivity and selectivity properties, the QCM was deposited with thin films using solgel dip coating method. The thin films were titanium dioxide (TiO₂), porphyrin and TiO₂ coated with dye porphyrin with the variation of TiO₂ and porphyrin ratio, i.e. 1:2, 1:4, 1:6 and 1:8 by volume. The porphyrin used was 5, 10, 15, 20-tetraphenyl-21H, 23H-manganese (III) chloride. It was found that all the thin films were sensitive towards all type of vapors and showed different degree of sensitivity for different type of vapors.

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