

Qualitative Assessment of Volatile Organic Compounds (VOCs) using Electronic Nose (E-Nose)

^{#1}Santosh Kumar, ^{#2}A.S. Mondal, ^{#3}J.L. Raheja ^{*4}A.L. Sharma

[#]CSIR-Central Electronics Engineering Research Institute, Pilani, India

^{*}School of Instrumentation, Devi Ahilya University, Indore-452001, India

E-mail: ceerisk@gmail.com

ABSTRACT: *Electronic Nose, i.e. E-Nose is an alternate system to assess the quality of food using their odours. The odours have the information about the ripeness of the food and also contain the qualitative as well as quantitative information. To assess this information with the proper sensing system, the quality of the food is to be predicted. In this research work, eight volatile organic compounds (VOCs) are analysed and tested for identification of the different VOCs using the developed e-nose system. The aroma data is recorded using "Vapour Detection UNIT" application program developed in the Laboratory Virtual Instrument Electronic Workbench (Lab VIEW) software environment in the personal computer (PC) for analysis. Peripheral Interface Controller (PIC) microcontroller has all the necessary features to develop an E-Nose system. PIC is used for reading the sensors signal. Analog input channel of microcontroller is used to capture the E-Nose responses. Total eight metal oxide nonspecific gas sensors are used in this research work. The achieved results have very clear discrimination between the different VOC samples. Therefore, using these results, one can have used this research work for the development of their own gas sensing / electronic nose system for different applications.*

KEYWORDS: Volatile Organic Compounds(VOCs), E-Nose Setup, Pattern Recognition, Qualitative Discrimination.

1. Introduction: An electronic nose is setup using different gas sensors/gas sensor array. These are TGS gas sensors which is nonspecific MOS gas sensors. The odor/aroma of VOC is sensed by these gas sensors and gives the changed signal according to their VOC information in voltages. When odor is in contact with volatile compounds, the sensors react and a change occurs in its electrical properties [1]. These signals (data) are recorded by PIC microcontroller via ADC channels after signal conditioning. These signals are used by different preprocessing techniques, data reduction techniques and pattern recognition for the qualitative discrimination between different samples and are used for odor sample identification. The block diagram of developed electronic nose is given in figure 1. This E-nose system is used for the classification of eight volatile organic compounds (VOCs). These VOCs are very harmful for human and can be identified the diseases, like cances, using VOCc studies and are present at common places such as museum [2-10].

