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Study Characteristics of GAS Sensor

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Abstract

It is observed that concentration of CO_2 gas is about 350-400 PPM, but it is predicted to increase up to 540-970 ppm by the end of the 21st century. It is important question that Will the carbon fixation capacity of trees and forests change in the future? What is the rate of our forests in a world with an increased atmospheric CO_2 concentration? So in future also there will much requirement of sensing devices for sensing $CO_{2\,gas}$ through space. This paper is studied according to requirement of gas sensor. In increasing the complexity of the process plants and others engineered system has extended the scope of interest in control system. In many distributed computing paradigms, especially control computing, programmers tie their application to a particular set of a microcontroller. In present work, personnel computer with advanced technology with advance operating system is used to take control of valve according to desired time. Various characteristics of sensor can be studied using the change in resistance with respect to ppm of gas at various gas flow rates. Required software can be developed using advanced Visual Basic language. Hardware consist of Microcontroller, PC, Solenoid Valve, Relay, DAC, ADC cards etc.

Keywords: ***Microcontroller, Soft instrumentation, Sensor, and CO_2 gas etc.***

Introduction:

After the vast development in the industries as well as energy sector. It is necessary to minimize the problems of gases especially CO_2 in the atmosphere, we have peculated on the role of forest ecosystems in CO_2 uptake. To be able to evaluate the carbon balance of the atmosphere in the future, we urgently need to understand how forests or trees respond to the predicted high CO_2 environment. Many studies have investigated forests under elevated CO_2 and temperature conditions, simulating the global greenhouse effect. Molecular electronics is a branch of nanotechnology. An interdisciplinary pursuit, molecular electronics spans physics, chemistry and materials science. This includes both passive (e.g. resistive wires) and active components such as transistors and molecular-scale switches. It is also called moletronics. The unifying feature is the use of molecular building blocks for the fabrication of electronic components. Due to the prospect of size reduction in electronics offered by molecular-level control of properties, molecular electronics has aroused much excitement both in science fiction and among scientists. In present paper, various characteristics of sensor can be studied using the change in resistance with respect to ppm of gas at various gas flow rates. Required software can be developed using Visual Basic language.

Experimental method:

Circuit consists of hardware as well as software. It used driver and switching circuit, it used IC AT89C52 microcontroller for programming and memory.CADC0809 as analog to digital converter with multiplexer, IC MAX232 as a driver/receiver and IC 555 as a timer. Switching circuit decides how solenoid valve of CO_2 gas cylinder should be driven with the help of software written in Visual Basic [6]. Various sensors such as LM25 used for sensing temperature. First set the time on the computer and using instructions, sends data to computers COM port. , This COM port generate data of 12V digital signal [7] but Micro controller IC 89C52 required only 5V. This conversion can takes place with the help of IC MAX 232. It is a dual driver/receiver conversion IC. Data of 5V stored at

buffer of IC 89C52. The IC 89C52 send the signal to the driver circuit ULN2003. If it sends signal 'E' to driver circuit then first output channel activated, when send signal 'F' then channel deactivated. Similarly for second and third channel G, H, J, K. activated and deactivated. ULN2003 .It also can be used to avoid loading effect. Crystal Oscillator can be used to apply clock pulses to 89C52 at frequency 11.0592 MHz. Hence relay can be switch 'on' and 'off' according to given time, relay control solenoid valve [8] and valve control CO_2 gas cylinder. Fig.1 shows setup of CO_2 gas sensing and controlling system.

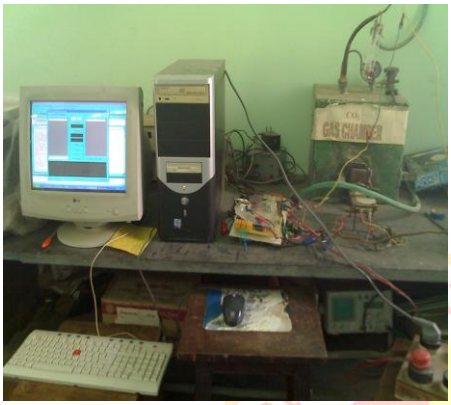

Fig. 1 set up of sensor system

Fig. 2 Circuit of developed system

Result and discussion:

Response of sensor Tin dioxide and copper oxide Concentration of CO_2 gas in chamber changes by varying the flow rate of gas at room temperature. Concentration of CO_2 gas can be increased either by increasing the flow rate of the gas (0.4 lit/min, 0.8 lit/min, 0.12 lit/min etc.) or how much time, valve of cylinder should open? The change in resistance with respect to ppm of gas is measured for sensor at various gas flow rates viz. The response of sensor is shown in fig.2, from the graph it is found that as concentration of CO_2 gas increases, resistance also increases. This is the characteristic of CO_2 gas sensor.

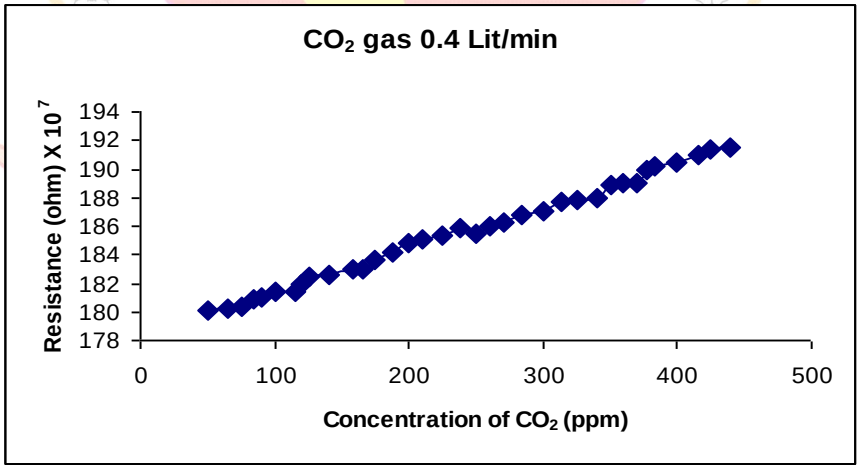

Fig.2. Response of Sensor (SnO_2-CuO)

Conclusion:

The paper describe attempt to improve the determination of the measurement of the sensing material i.e. Sensor. The direction of the improvement can be described in general to be aimed

towards enhancing accuracy, precision and reliability. Responses of developed system are studied with samples. Sample consists of the mixed oxide SnO_2-CuO (Tin dioxide and copper oxide) sensor. Responses of samples with CO_2 gas is taken at room temperature as well as varying temperature. During this, concentration of gas is varied and recorded the changes. Responses of samples are discussed in results. It is found that, resistance increases as concentration of CO_2 gas increases.

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