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Gas Sensor and Heat Sensor

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Introduction

During the past few decades, gas sensors are based on surface characteristics or on some of bulk electrolytic properties of ceramics which has been the extensive result of research works. From air to fuel application of these types of sensors ranges to the most. In industrial leakage of toxic gases set for the application of sensor that detects all harmful effects. There are various gases that are involved in gaseous sensor work.

On the other hand it is also true that world is getting warmer day by day and this is really affecting our day to day activities. So to measure the temperature, heat or temperature sensor has been invented. It actually quantifies the heat content of the body on a scale. In this particular topic of comparison research we have studied about chemical and heat sensor.

In this particular research paper we are also studying about the emerging technology of gas and heat sensor. Gas sensor is mostly used in chemical purposes such like industrial hazards and security purposes. In all section of all activities of mankind it is been used widely in industry.

History

Gas leak detection is a process became a concern after the effects that are so harmful on human health that were discovered. Before the modern electronic sensor, early detection methods were followed by the sensing carbon monoxide and carbon dioxide which are of life threataning. Mainly sensors or detectors were invented to detect single gas but modern units may detect multiple gases or even a combination of gas.

Body

Gas sensor

The application of solid state gas sensor are form air to oil and maintained all the ratios in the combustion processes such as we can say in automotive engines and industrial furnace. While the solid state physical sensor that are measuring pressure, temperature and many other parameters have been successful in various way. In the gas sensor mechanism various gases are used likeO_2,H_2,CO,CO_2,NO_x,SO_x, propane, methane, ethanol, and so on.

Chemical sensors that are based on semiconductor have gained more popularity due to their small size, simple operation and high range of sensitivity. But apart from that they are of high level of non-selectivity because their sustainability and stability in long range. The sensing capabilities are always in the topic of research so that it can be applied in real world problem. Here we have taken semiconductor sensors that are combustible in nature as an example. (Sheikh Akbar & Lee, 2006)

Semiconductor Sensor for combustible gas

The most sensitive material of gas sensor is Sno2 in the lower conductivity in fresh air. It actually makes detection by the method of cycle high and low temperature with detection of carbon monoxide in low temperature. The conductivity of sensor is higher with the concentration of gas. When the temperature rises to 5V it detects Methane, Propane, and etc. category of gases. It is also recommended that to use simple electromagnetic circuit that actually converts the conductivity to corresponding output signal and gas.

MQ-9 is a gas sensor has higher level of sensitivity to carbon monoxide, methane and LPG. These sensors can be used to detect different gases contains CO and combustible gases. Character of these types of gas sensors are like having good sensitivity to the CO or combustible gases, high sensitivity to methane, propane and carbon monoxide. The most effective advantage that can be taken into account is the low cost and long life guarantee. It also follow very simple circuit diagram.

Graphene based gas sensors

The most advanced level of sensor that are now used in the strength and mechanism of multiwall carbon nanotubes and monolayer graphene are as follows. Relation between the changes of potential energy with crack growth of any brittle system is shown in this report. This is published by the groundbreaking structure made by Griffith in 1921. He actually deduced that the actual breaking strength of a material that is brittle is governed by the size of defects and flaws that are found in any system. The elastic properties and the intrinsic breaking strength of free monolayer are standing by the graphene membrane by Nano indentation of atomic force microscope. The nonlinear elastic stress strain response shows the force displace behavior which is interpreted by this kind of process.

The young's modulus E= 1.0 terapascal and the third order elastic stiffness is D=-2 and the intrinsic strength is of value 130 gigapascal only for bulk graphite. To emphasize the point, Griffith wrote that "in the limit, in fact, a fiber consisting of a single line of molecules must possess the theoretical molecular tensile strength". The maximum level of failure that can be supported by the material prior to the defects with intrinsic property, Intrinsic tensile strength by measuring the breaking strength of a serious glass fiber with progressive smaller diameter and intersecting the result to an atomic radius. (Novikov, Lebedeva, & Satrapinski, 2015)

Application

These types of gas sensor are mostly used in domestic gas leakage detector, industrial gas leakage system and it is act as portable gas detector kit.

Some precautions must be taken while using gaseous sensors are like exposition to organic silicon steam that will damage the sensor and make it to a faulty one. It is also has to be taken in account that sensor must not be expose to High corrosive gas, that will affect the result of sensor detections. Halogen pollution must be avoided to make the performance alright. So while use sensor these points must be considered for smooth running.

Temperature/Heat sensor

There are four main temperature sensing devices that are available like thermocouple, resistance temperature detectors that are mostly called RTD, thermistors and temperaturetransducing devices. Actually these sensors transfer the temperature to certain reference voltage, resistance or current, which after evaluate and analyzed by certain process.

The Seedback effect explained that in case of temperature sensors theory if a circuit is made by the conjunction of joining two wires of different metals, any differences in temperature between two junctions will produce EMP which will help to flow of current in the circuit. (Khan & Kang, 2016)

It is also taken in account that the output signal is not independent upon the difference in temperature between the sensing junction and the reference junction. The accuracy of thermocouple is dependent on the quality of element and the standard that are maintained that are of national standard. Any kind of job should be maintained through some international standard. Temperature sensor now days used mostly in various purposes like weather forecasting.

History

The first thermistor was discovered in the year 1983 by Michael faraday who actually reported on the behavior of semiconductor of silver sulfide. It is seen that silver sulfide gone decrease dramatically with the temperature increase.

Thermocouple used in Heat Sensor

Thermocouple is used in various instruments to have the sensing facility. As for example in fridge we use thermocouple to control temperature and there we use various thermistors. Thermistor is special type of duo that is made by two special types of couple of metal.

Thermistor

Thermistor are solid state devices that actually works on the basis of change of electrical resistance with temperature and operate on the negative part of coefficient that when resistance falls with rising temperature and sometimes with the positive coefficient with rising temperature. Thermistor can lead to the extended with the copper wire, if the thermistor is appropriate for the temperature that ranges but in negligible compared to the devices.

In industry some PTC thermistor undergo a sudden undergo a sudden large increase in resistance at some of the certain temperature normally used by the Testtemp is the RS component that has high sensitivity makes the element very suitable in all ranges.

Application in steel industry

Thermocouple is used extensively in the steel and iron industry to monitor temperatures and chemistry throughout that making of steel. Disposable, immersible and type s thermocouple are normally used arc function.

Gas appliance safety

Many gas fed heating appliances such as ovens that makes us for the pilot flame to ignite the flames when required. Any kind of hazardous work that are done in steel industry when it is required, to prevent this some appliances use a thermocouple in a fall safe circuit sense at the time of lighting burning. Some system known as control system that are controlled in millivolt extended the thermocouple concept to both open and close that main gas.

It is only works through the thermostat to power the main gas valve to light up the gas chamber for the purpose, and thermocouple is used rather than single thermometer. Now the system has really changed and got advancement about the energy wasted by the standing point flame to an electronically controlled pilotless device. As for example water heaters are now widely used in industry and as home appliances could manage to detect all the temperature change.

Conclusion

Now a day the main concern for the industry is safety, but it can only be achieved through various advance technology. One of the smart applications on a class of material and electronics properties of silicon is now highly achieved through various form research. It is considered that smart sensors are advanced technology and becoming a considerable part of various fields such as industries, medical defense, and silicon plays an important role for the development in the security purposes.

Still lot of research has been done have good quality sensors and detectors. In this particular part of report it we have discussed about chemical sensor like gas sensor that are been widely used in industries to avoid accident. On the other hand we have also reported from various research works about the usefulness of heat or temperature sensor. Heat sensor is widely used in the industry to get the extra heat generated at the time of production.

I have tried to cover various aspects according to my perception about the current trend of sensor that includes gas and heat or temperature sensor. We human are now most dependent on various types of electronic sensor devices to ease our jobs. As for example we can say that temperature sensor are used in thermometer that we use mostly in our daily life, like this way we can say that sensors are very important to be more advance in all sort of improvement. More things are going on research about smart sensor that will include emerging technology.

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