Feasibility Study of CO, CO_2, NO_2, and O_2 Sensors for Hazardous Gas Detection System in Vehicle Cabin

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Abstract CO, CO_2, and NO_2 are gases that are commonly found from the emission of a vehicle exhaust pipe. They normally exist in the form of odorless, colorless, and tasteless. Large amount inhalation of these gases will cause serious health effects such as fatigue, respiratory problems, drowsiness, and death. These toxic gases will flow into the vehicle cabin once leakage happens and the O_2 gas inside the vehicle cabin will decreases and oxygen deficient occurs. The objectives of this research is to study the feasibility of CO, CO_2, NO_2, and O_2 gas sensors for hazardous gas detection system in vehicle cabin and the suitable location for the hazardous gas detection device to place inside the vehicle cabin. Two experiments were carried out to determine the amount of CO, CO_2, NO_2, and O_2 gas released from the exhaust pipe and inside the vehicle cabin by using two different vehicles. The gas concentration collected from these two experiments were compared to the safe limit. The CO concentration released from the exhaust pipe was over the safe limit and the O_2 percentage collected was too low compared to the safe limit. On the other hand, the concentration of gases collected inside the vehicle cabin were at a safe level. The concentration of CO_2 and NO_2 collected from the exhaust pipe and inside vehicle cabin were below the safe limit where these two gases are at safe level. Therefore, it is proven that the CO and O_2 sensors are important for hazardous gas detection system. This can be concluded that the CO and O_2 sensors are suitable for the hazardous gas detection system in vehicle cabin.

Keywords Carbon monoxide (CO) · Oxygen (O_2) · Hazardous gas detection device · Vehicle cabin

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