GAS CHROMATOGRAPHY SYSTEM USING SEMICONDUCTOR SENSOR AND NEURAL NETWORK FOR CLASSIFICATION OF CRUDE OIL

Student Name : Sugeng Dwi Riyanto  
NRP : 2209204004  
Supervisor : Dr. Muhammad Rivai, ST., MT

Abstract

Gas chromatography equipment is widely used in many fields, such as; food, health, oil and gas industries. In the field of gas and oil industry this instrument can be used to analyze the compound of gas or crude oil. Gas Chromatography instrument consist of a partition column which is the main part of this system used to separate components contained in the gas mixture. As mobile phase material, gas is going to interact with the stationary phase material in partition column. Components which have strong bond with the stationary phase will be retained on the column and pass through the column more slowly than those which do not react to the stationary phase. Therefore the detector will detect the gas at the end time. Commonly used detectors require a high voltage (180 V) and a high temperature (600°C-800°C). In this research, semiconductor sensor is used as detector in this gas chromatography system. Compounds entering to the gas sensor will increase its voltage. This sensor can detect content of methane (CH₄), iso-butane (C₄H₁₀), iso-octane (C₈H₁₈) and n-hexane (C₆H₁₄) which usually present in the crude oil. Neural network is trained to recognize three types of tested crude oils. Neural network is able to recognize the sample with the accuracy of 80%.

Keyword: gas chromatography, partition column, semiconductor sensor, neural network