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Commentary

Note on Gas Liquid Chromatography (GLC)

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DESCRIPTION

Chromatography is a technique for separating chemicals based on differences in the separation behavior between the mobile phase and stationary phase that flows to separate the components in the mixture. Gas Liquid Chromatography (GLC) is one of the most useful methods in analytical chemistry. Clausen published one of the first important accounts of gas liquid chromatography in 1946. Gas-Liquid chromatography is a form of separation chromatography in which the stationary phase is a film coated on a solid support and the mobile phase nitrogen (an inert gas such as N_2 .) is called a carrier gas flowing over a liquid film surface in a controlled manner. The sample under analysis evaporates under high temperature programming conditions. The components of the vapor sample are divided as a result of the separation between a mobile gas phase and a liquid fixed phase placed in a column. Principle: As the vapor of the sample mixture moves between the stationary phase (liquid) and the mobile phase (gas) the different parts of the sample mixture separate according to their separation coefficient between the gas and liquid phase. The general assumption is that if the partition coefficient is low, the emergence of the component will be faster and vice versa. Materials with a lower evaporation point (B.P) have higher volatility and higher vapor pressure have a higher concentration in the mobile phase and are thus pre-elite or derived. For example, low carbon number compounds have low B.P and high volatility and vapor pressure is elite earlier than high carbon number compounds e.g. less chain fatty acids than the long chain were the first to emerge. Therefore less polar materials elite faster than polar materials. Most polar objects are kept high in the column and therefore move slowly compared to low polar objects moving at high speeds.

Two terms commonly used in chromatographic analysis are (i) retention time and (ii) retention volume. Retention Time (tR): This is the maximum time required for a solution peak (peak of a specific component) to reach the detector in the gas chromatographic column. The Retention Time (tR) is proportional to the characteristic of the part and the area below the peak to its magnitude. These parameters provide qualitative and quantitative data, respectively. Characterization of the mixture in the unknown sample is done by retention time compared with reference compounds. The relative proportion of various components in the mixture is determined by calculating their maximum areas and then the percentage of peaks from the total area of the various peaks obtained. Retention Volume (VR) is defined as the volume of gas required to carry a maximum of one component through the column VR = tR Fc, where Fc is the volume flow rate of gas at the outlet.

Gas liquid chromatography is commonly used for both qualitative and quantitative analysis of organic compounds. Agriculture, agro-industry, food industry, eco-field, forensic field, biotechnology field, perfume and fragrance industry are the most sought after technologies in the cosmetics and chemical industries. This technique is very useful for estimating pesticide and pesticide residues in food and other contaminants.

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