ELSD: Design Principles and Structure

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The Evaporative Light Scattering Detector (ELSD) is a detector commonly used in liquid chromatography analy the principle of measuring the scattering of light from particles formed when the sample is atomized, evapora converted into aerosol particles with the aid of an auxiliary gas. The basic structure of the ELSD consists of thr components: aerosolization and droplet treatment, evaporation, and light scattering detection.

1. Aerosolization and Droplet Treatment: The liquid phase is mixed with the auxiliary gas and passed through a no: nebulizer to form a dense mist (liquid aerosol or droplets). Due to the non-uniformity and inconsistency of the liqu requires treatment to ensure effective evaporation. This treatment process is called splitting, and different splitting can be used, such as restrictor splitting, impactors, low-temperature splitting, and thermal splitting. Different ELSD A and Type B) are distinguished based on different splitting techniques, which affect the droplet treatment and eva efficiency.

2. Evaporation: The aerosolized liquid undergoes further flow towards the heated region (evaporation zone or drift evaporation zone, the liquid aerosol gradually evaporates under the influence of heat. Components of the sample volatility form particles and are driven into the light beam channel by the auxiliary gas.

3. Light Scattering Detection: The detection area contains a light source and a light detector. The light source form light after optical processing, passing through the end of the drift tube. When the sample particles enter the light scattering occurs. The scattered light is detected by a light detector positioned at 90 degrees, generating a scatter signal. By measuring the intensity of the scattered light, the quantity of sample particles can be predicted, and thu concentration can be determined.

The design principle and structure of the ELSD allow it to detect samples that are not easily volatile in the liquid ph providing a sensitive and versatile detection method suitable for various liquid chromatography analysis applicatic Depending on the nature of the sample and analytical requirements, the appropriate ELSD type and operating para be selected to obtain accurate and reliable analytical results.

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ContactMan : Luis liu Fax : 86-0571-88866373 GoogleSitemap

Mobile : 13517991832 Email : sales1@wookhplc.com

Address :Ganxiang Analytical Instru

Industrial Park, Anyuan District, Pin

Province

Telephone： 86-0571-88866361