

2.6: Evaporative Light Scattering Detection

Evaporative light scattering detection is a specialized technique in which UV radiation is used to detect non-UV-absorbing compounds separated by liquid chromatography. The column effluent is passed through a heated chamber that evaporates the mobile phase solvent. Non-volatile analyte compounds, which is usually the case for compounds separated by liquid chromatography, form solid particulates when the solvent is evaporated. The solid particulates scatter UV radiation, which will lead to a reduction in the UV power at the detector (i.e., photomultiplier tube) when a compound elutes from the chromatographic column. The method is more commonly used to determine the presence and retention time of non-UV-absorbing species in a chromatographic analysis rather than their concentration. It is common in liquid chromatographic separations to employ a buffer to control the pH of the mobile phase. Many buffers will form particulates on evaporation of the solvent and interfere with evaporative light scattering detection.

Evaporative light scattering detection is encompassed more broadly within a technique known as **turbidimetry**. In turbidometric measurements, the detector is placed in line with the source and the decrease in power from scattering by particulate matter is measured. Nephelometry is another technique based on scattering, except now the detector is placed at 90° to the source and the power of the scattered radiation is measured. Turbidimetry can be measured using a standard UV/VIS spectrophotometer; nephelometry can be measured using a standard fluorescence spectrophotometer (discussed in Chapter 3). Turbidimetry is better for samples that have a high concentration of scattering particles where the power reaching the detector will be significantly less than the power of the source. Nephelometry is preferable for samples with only low concentration of scattering particles. Turbidimetry and nephelometry are widely used to determine the clarity of solutions such as water, beverages, and food products.

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