

Evaporative Light Scattering Detectors

as an Alternative Detection Method for Flash Chromatography

Abstract

The CombiFlash® Rf system has an input that allows external detectors to send an analog peak signal for display and peak cutting. Examples of detectors that can be used with the CombiFlash Rf system include Refractive Index (RI), fluorescence, visible light¹, Evaporative Light Scattering Detectors (ELSD), or other devices generating a voltage range of 0–1 volt². This feature is available on CombiFlash Rf systems with an external detector connector (serial number 209C20075 and higher) and running software version 1.5 or higher. Earlier systems may be upgraded; contact the factory for more information. The connection and use of an ELSD is discussed with examples.

Background

ELSD works by measuring the light scattered from solute particles remaining after nebulization and evaporation of the mobile phase. An ELSD consists of three main parts:

- The *nebulizer* where the compound and mobile phase are sprayed into the detector as droplets.
- The *drift tube* evaporates the solvent leaving the compounds as a fine powder. The drift tube is generally heated to facilitate evaporation of the solvent.
- A *detector* containing a light source and sensor.

ELSD is used when a compound has no chromophore or a weak chromophore, or the chromophore is masked by the absorbance of the mobile phase. ELSD is also used when the absorbing wavelength of the desired compound is unknown.

Teledyne Isco's CombiFlash 340CF ELSD is configured for optimal results for Flash chromatography.

Note

Buffers containing metal cations are not compatible with ELSD because they also produce particles after solvent removal that masks eluted compounds.

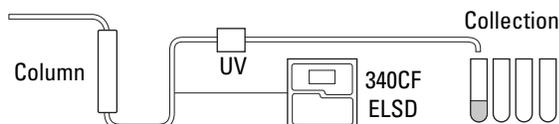


Figure 1: Simple diagram of fluid path

Discussion

Connection to CombiFlash Rf

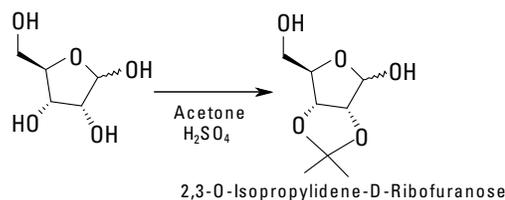
Evaporative light scattering detectors are considered “destructive detectors” where the sample is lost as part of the detection technique. The actual amount of sample lost is small (less than 5%).

CombiFlash Rf systems deliver flow rates that range from 5 through 200 mL/minute. The CombiFlash 340CF ELSD detector (P/N 69-5237-062) meters off the optimal sample rate regardless of the flow rate of the CombiFlash Rf system (Figure 1).

An external ELSD such as the 340CF can be shared among different CombiFlash Rf or other chromatography systems offering a cost effective and space-saving solution to changing projects.

Example 1:

2,3-O-Isopropylidene-D-Ribofuranose



This compound contains no chromophores and is impossible to fractionate with UV detection.

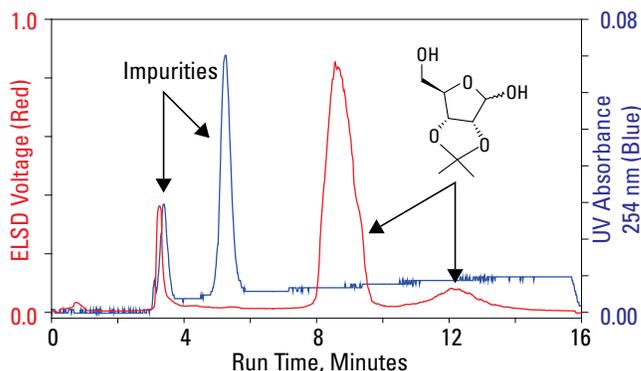


Figure 2: Purification of 2,3-O-Isopropylidene-D-Ribofuranose

1. The CombiFlash Rf-200 with UV-vis detection is available as part number 68-5230-008
2. Contact the factory for special cable if the voltage range exceeds 1 volt.

Example 2: Cholesterol and *p*-aminobenzoic acid mixture

Cholesterol and *p*-aminobenzoic acid were dissolved in ethyl acetate and injected onto a RediSep® Rf column.

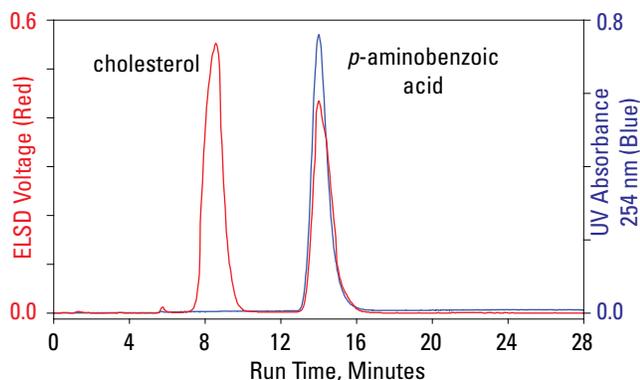


Figure 3: Purification of cholesterol and *p*-aminobenzoic acid on a RediSep Rf column with UV detection laid on an ELSD run.

ELSD Ordering Information

Teledyne Isco offers preparative and an analytical ELSD modules.

68-5237-062 – Model 340CF Evaporative Light Scattering Detector. For use with preparative chromatography systems of 5 mL/min or greater. ELSD has self-contained flow splitter pump for minimal sample loss. Includes connections for 1/8" OD tubing. Optional connection kit, 60-5247-021, is necessary for Torrent or systems using 1/4" OD tubing. Variable wavelength detection option is required for operation with Rf-75. Contact factory for cables for use with non-CombiFlash systems. External nitrogen supply is required.

68-5237-067 – Model 330 Evaporative Light Scattering Detector. For use with analytical chromatography systems up to 5 mL/min. Unit is compatible to either 5V or 1V analog data systems. Compatible with 1/16" OD tubing. External nitrogen supply is required.

60-5247-021 – Connection kit for Model 340CF to CombiFlash Torrent or systems using 1/4" OD tubing.

Conclusion

The CombiFlash Rf system has the ability to display the input from external detectors and collect fractions from this input. In this case, an ELSD was used as the external detector. The advantages of an ELSD are that it enables collection of peaks not visible to the UV detector built into the CombiFlash Rf system.

The CombiFlash 340CF ELSD is optimized for flash chromatography and is easily attached to the CombiFlash Rf system.

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Teledyne Isco

P.O. Box 82531, Lincoln, Nebraska, 68501 USA
Toll-free: (800) 228-4373 • Phone: (402) 464-0231 • Fax: (402) 465-3091
E-mail: IscoInfo@teledyne.com

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