



## SICRIT® LC/SFC Module

The SICRIT® LC/SFC Module combines the SICRIT® ionization technology with classical sample separation of liquid or supercritical fluid chromatography



The SICRIT® LC/SFC Module enables the connection from conventional liquid or supercritical fluid chromatography to mass spectrometers using the SICRIT® ionization source. Nano-, normal and reversed phase, as well as ultra-high performance LC modes are supported with this module.

A *click-on* slide adapter allows for easy installation of this module onto the SICRIT® source with gas tight connections. The module consists of a ceramic heating cartridge, high performance nebulizer, and an option to add sheath gas for enhanced vaporization.

With this module, LC or SFC effluent is connected to the nebulizer, vaporized in the heated cartridge, and drawn into the SICRIT® ion source, enabling conventional chromatographic separations with the unique ionization from the SICRIT® source.

### Fields of Application

The LC/SFC module enables easy and robust vaporization of liquids

#### LC: Mobile Phases

Classical LC solvents along with modifiers can be used, thus reversed and normal phase separations can be

achieved. Effluent flows of up to 0.8 mL/min can be used with this module. For micro and nano flows an additional sprayer version is available. The maximum allowable flow rate is dependent on the mobile phase. For example, using acetonitrile/water this max recommended flow rate decreases to approximately 0.5 mL/min. Above this point, the solvent effect of acetonitrile may decrease sensitivity due to its high ionizability and subsequent suppression effects for certain analytes. A list of common solvents and their respective maximum recommended flow rate is given in table 1.

Table 1: Common LC solvents and their max recommended flow rates

Solvent	Recommended Max (µL/min)
MeOH	800
Alcohols (general)	800
THF	500
Hexane	500
Acetonitrile	500
DCM	700
CO <sub>2</sub>	2000
Water	500

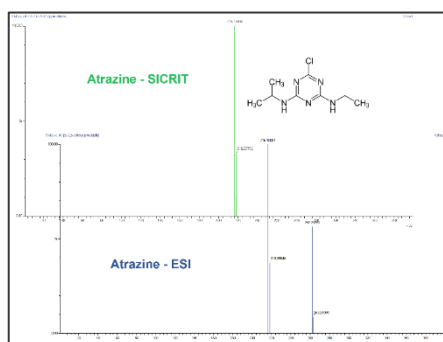
The design of the LC/SFC module allows for a high salt tolerance as only the vaporized effluent will enter the MS. Non-volatile modifiers will exit to waste by drain line at the bottom of the module. Therefore, a wide range of buffers and modifiers can be used with this setup at a variety of concentrations. However, under long periods of high salt amounts, the module can be cleaned with simple solvent rinsing. Further as the modifier usually does not negatively affect the ionization, it can be selected to give the best chromatographic separations.



## LC Applications

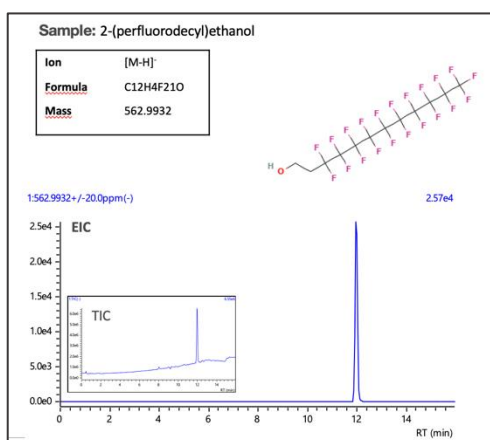
This module fits in with typical LC-MS workflows. High sensitivity, linearity and precision have been observed when utilizing this module in combination with the SICRIT®-MS for analysis of various triazine pesticides. When compared to ESI, a cleaner spectrum is observed with no fragmentation and a strong  $[MH]^+$  ion, unlike sodium or potassium adducts commonly observed with ESI.

Figure 1: Comparison of fragmentation of Atrazine by ESI and the SICRIT®-MS.



This has also been applied to compounds that are typically difficult to ionize by ESI or APCI, such as BHT and Phenol; however, they can now be analyzed by the coupling of this module to the SICRIT® source. This coupling has also been used to ionize PFC compounds not accessible by ESI or APCI, seen in figure 2.

Figure 2: EIC of 2-(perfluorodecyl)ethanol when analyzed by the LC/SFC module in combination with the SICRIT®-MS



## SFC Applications

Typical setups for supercritical fluid chromatography can also be paired with this module. This coupling now allows for SFC setups to gain all advantages of the SICRIT® ionization source. This setup has shown feasibility for analysis of various pesticides, pharmaceutical samples, as well as oxy-polycyclic aromatic hydrocarbons, of which are often difficult to ionize by ESI. (Further reading [Application Note: AFIN-TS](#))

## Technical Specifications



Dimensions	OD x L 50 x 220 mm
Weight	800 g
Supply Voltage	24V
Electrical Connections	8 Pin Lemo Connector fitting SC30 Module port
Temperature Control	100 to 500°C
Operation Conditions	Same as SC30
Sheath Gas Conditions	0-25l/min

## References

1. Application Note: Dielectric barrier discharge ionization (DBDI) as a universal atmospheric pressure ion source (API) for the hyphenation of gas chromatographic, liquid chromatographic and supercritical fluid chromatographic separations with the same time-of-flight mass spectrometer, S, Bieber and T. Letzel, AFIN-TS GmbH, 2021