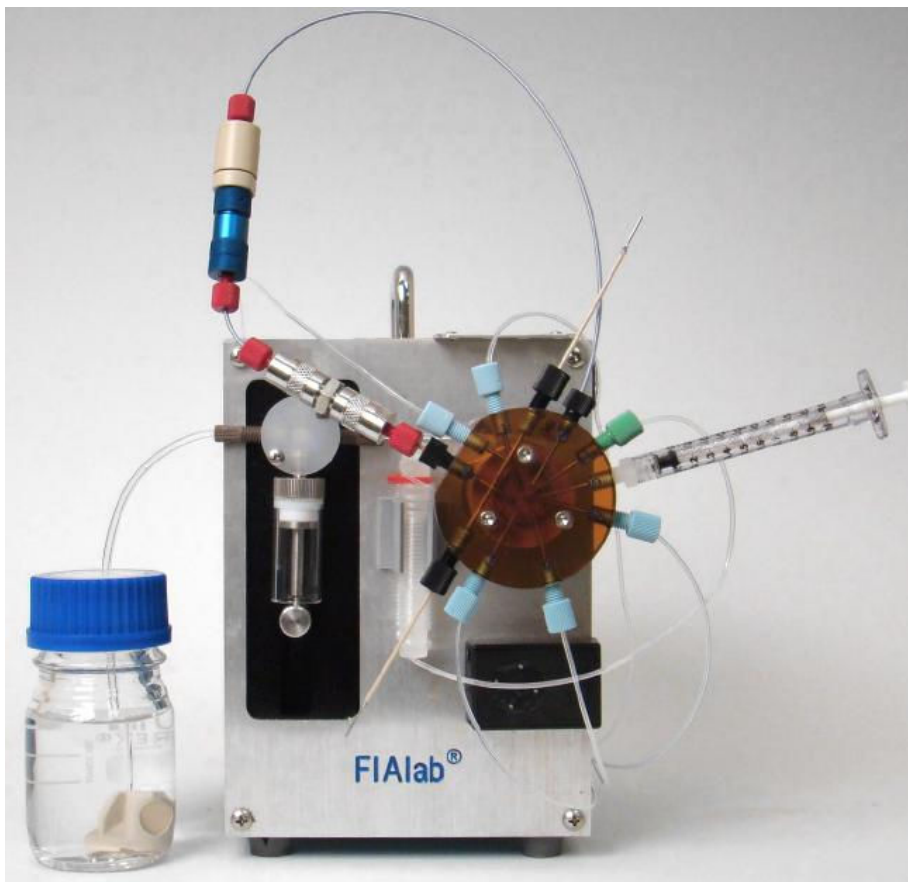


Educational ion chromatography (IC) option



The ion chromatography (IC) option is intended for educational use. It can be used with any MicroSIA / FIALab SIA instrument with a Lab-On-Valve manifold, and includes:

- electrodes for conductivity measurements
- a conductivity meter
- an external A/D board
- a 5×4.6 mm column holder, as well as three 5×4.6 mm C₁₈ columns
- didodecyldimethylammonium bromide (used for converting the C₁₈ columns into ion exchange columns)
- packed cartridge to be used as a suppressor column
- extra packing material for re-packing the suppressor

A schematic view of the IC option is shown in Fig. 1.

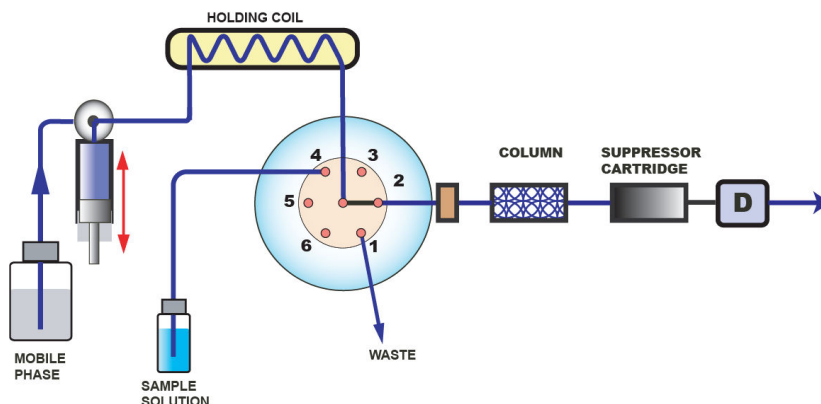


Fig. 1 Arrangement of the IC option on a MicroSIA / FIALab 3500 instrument.

The IC option has been designed to provide a low cost ion chromatography setup that is completely transparent. Due to its transparency and ease of use, the setup is ideally suited to illustrate the fundamentals of ion chromatography and conductivity detection, such as

- influence of eluent type
- influence of eluent concentration
- sensitivity increase provided by suppressed detection mode (see Fig. 2)
- electrode arrangement for conductivity detection
- electronics arrangement required to convert a current output to voltage signal

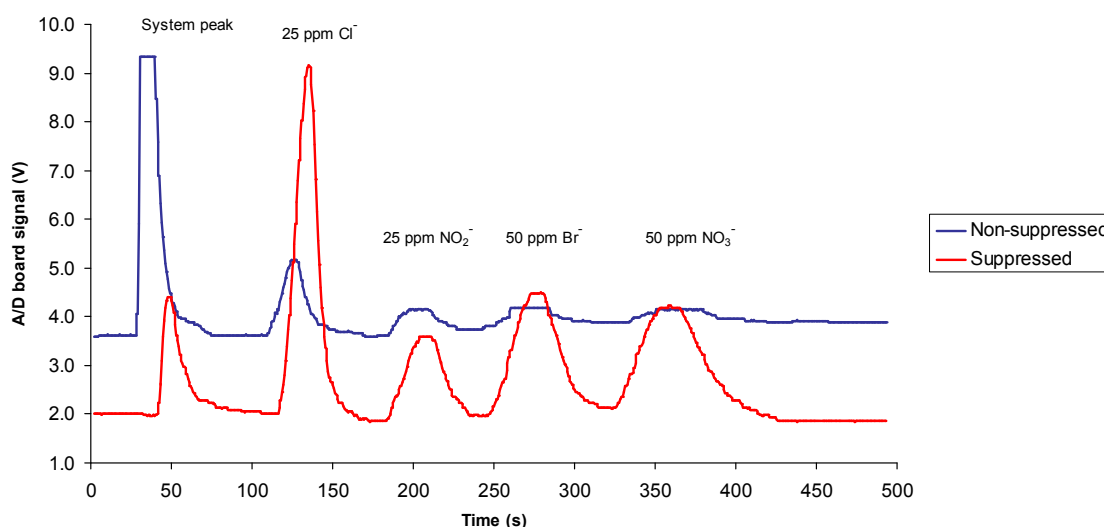


Fig. 2 Comparison of suppressed and non-suppressed conductivity detection. Separation column: Onyx 5 x 4.6 mm C18 column, coated with didodecyldimethylammonium bromide. Eluent: 1.5 mM 4-hydroxybenzoic acid pH 5.5.

The system can be used with any low pressure ion chromatography column. The recommended column type is a 5 mm × 4.6 mm monolithic silica C₁₈ column that the user converts to an anion exchange column by flushing it with a cationic surfactant. This kind of column provides decent separation at extremely low backpressures (~25 psi without suppressor column, ~40 psi with suppressor column).

The suppressor cartridge can be packed with any strong cation exchange material to provide a low cost suppressor column that is easy and cheap to renew in the event of fouling or blockage. The packing material supplied in the kit is Dowex 50 WX8-200 strong anion exchanger. Likewise, the conductivity flowcell has been designed in such a way that the electrodes can be easily removed for inspection, polishing etc.

The suppressor material needs to be periodically regenerated with sulfuric acid, as is the case for any packed bed type suppressor. The system can be configured so that regeneration can be carried out without detaching the suppressor from the system. Alternatively, the system can be set up to periodically (e.g. after every three sample injection) deliver a bolus of sulfuric acid through the suppressor column to keep it charged over a longer period of time.

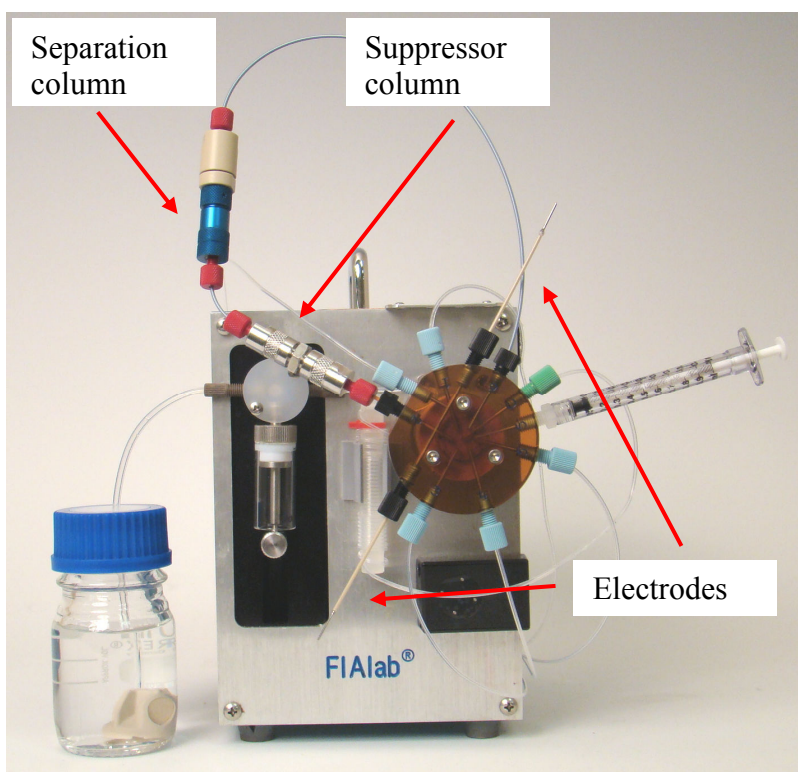


Fig. 3 A photograph of a MicroSIA instrument configured for ion chromatography. The picture shows the separation column, the suppressor column and electrodes for conductivity detection.