Overview

Purposes: Increase throughput in routine size-exclusion chromatography (SEC) methods.

Methods: The data on exclusion chromatography techniques: interlaced, tandem, parallel and possible testbed to obtain maximum throughput.

Results: Valves enable fast electrophilic detection for SEC analysis. Depending on the requirements, one of the valves can be selected.

Introduction

During routine analysis, separations need to be performed at a certain rate in order to satisfy the demands of the industry. In order to perform interlaced injection analysis, a setup with two columns has been developed. This setup allows for the simultaneous analysis of two samples, thereby increasing the throughput of the analysis. In this setup, two columns are connected in series, allowing for the analysis of two samples simultaneously.

System configuration and instrument method setup

Interlacing SEC

For the setup of the interlacing SEC, a system must be configured to allow for the simultaneous analysis of two samples. This is achieved by setting the system to perform injection on one column while the other is waiting. Additionally, the system must be configured to perform detection on both columns simultaneously. This allows for the simultaneous analysis of two samples, thereby increasing the throughput of the analysis.

Tandem-Interlacing SEC

This setup involves the use of two columns, with one column for injection and the other for detection. The columns are connected in series, allowing for the analysis of two samples simultaneously.

Parallel-Interlacing SEC

This setup involves the use of two columns, with one column for injection and the other for detection. The columns are connected in parallel, allowing for the analysis of two samples simultaneously.

Discussion

For all interlacing setups, it is important to optimize the injection (e.g., injection volume, sample volume, etc.).

Conclusion

- With a standard HPLC and Chromera software, interlacing injections can be performed to increase the throughput of the analysis.
- With two additional valves, tandem interlacing SEC can be set up. This setup allows for the simultaneous analysis of two samples, thereby increasing the throughput.
- With just one additional valve, tandem SEC can be used. This setup allows for the simultaneous analysis of two samples, thereby increasing the throughput.

Acknowledgements

We would like to thank Patrick Diederich from the Karlsruher Institut für Technologie for providing the setup. The latter can also be applied for the tandem setup. Chromeleon allows the sharing of the TCC over multiple time bases which makes it possible to work with two columns. This is necessary for the parallel-injecting SEC. The preliminary setup, but also the final setup of the later, is based on the information of the authors. The maximum throughput is achieved when the TCC triggers TB1 to start counting.

References

- Thermo Fisher Scientific, Australia & New Zealand

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