

Accepted Manuscript

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PII: S0021-9673(18)30385-6
DOI: <https://doi.org/10.1016/j.chroma.2018.03.058>
Reference: CHROMA 359297

To appear in: *Journal of Chromatography A*

Received date: 3-11-2017
Revised date: 26-3-2018
Accepted date: 29-3-2018

Please cite this article as: Marek Minarik, Martin Franc, Milan Minarik, High performance liquid chromatography column efficiency enhancement by zero dead volume recycling and practical approach using park and recycle arrangement, *Journal of Chromatography A* <https://doi.org/10.1016/j.chroma.2018.03.058>

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High performance liquid chromatography column efficiency enhancement by zero dead volume recycling and practical approach using park and recycle arrangement

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Highlights

- Zero dead volume recycling with one column and pump outside of the recycling loop.
- Park and recycle option enables to select and reinject any part of chromatogram.
- Usable with any column, in analytical and preparative mode.
- Effective number of theoretical plates approach half a million.

Abstract

A new instrumental approach to recycling HPLC is described. The concept is based on fast reintroduction of incremental peak sections back onto the separation column. The re-circulation is performed within a closed loop containing only the column and two synchronized switching valves. By having HPLC pump out of the cycle, the method minimizes peak broadening due to dead volume. As a result the efficiency is dramatically increased allowing for the most demanding analytical applications. In addition, a parking loop is employed for temporary storage of analytes from the middle section of the separated mixture prior to their recycling.

Keywords: closed loop recycling, peak recycling, recycle system, sample recycler, circulation chromatography

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