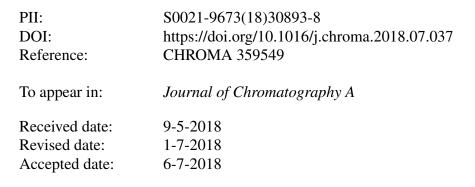
#### Accepted Manuscript

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### ACCEPTED MANUSCRIPT

# Axial heterogeneities in capillary ultrahigh pressure liquid chromatography columns: Chromatographic and bed morphological characterization

Arved E. Reising<sup>a,1</sup>, Justin M. Godinho<sup>b,2</sup>, Janek Bernzen<sup>a</sup>, James W. Jorgenson<sup>b,\*</sup>, Ulrich Tallarek<sup>a,\*</sup>

- <sup>a</sup> Department of Chemistry, Philipps-Universität Marburg, Hans-Meerwein-Strasse 4, 35032 Marburg, Germany
- <sup>b</sup> Department of Chemistry, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina 27599-3290, United States

\* Corresponding authors.

E-mail address: tallarek@staff.uni-marburg.de (U. Tallarek); jj@unc.edu (J.W. Jorgenson).

- <sup>1</sup> Current address: TNG Technology Consulting, 85774 Unterföhring, Germany
- <sup>2</sup> Current address: Advanced Materials Technology, Wilmington, Delaware 19810, United States

#### **Highlights**

- Systematic axial heterogeneities depicted for 75 µm i.d. capillary UHPLC columns.
- Kinetic performance study complemented by bed morphological analysis.
- Highest separation efficiency and bed homogeneity observed towards column outlet.
- Enhanced band broadening contributions from wall effects towards column inlet.
- Constant-pressure mode causes axial gradients in packing rate and bed morphology.

#### Abstract

We study axial heterogeneities in capillary ultrahigh pressure liquid chromatography (UHPLC) columns through kinetic performance and bed morphological analysis. Two columns are used in this work, a 75  $\mu$ m i.d. × 100 cm column packed with 1.3  $\mu$ m C18-silica particles and a 75  $\mu$ m i.d. × 45 cm column packed with 1.9  $\mu$ m C18-silica particles. The long column is chromatographically

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