KINETIC ADVANTAGES OF CORE-SHELL PARTICLES AS A MEANS TO GENERATE HIGH PEAK CAPACITIES IN LIQUID CHROMATOGRAPHY

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ABSTRACT

The new generation of porous-shell particles offers a quantum leap in chromatographic performance compared to their fully-porous counterparts. Another major technological improvement emerging in the past years was the introduction of ultra-high pressure instruments, often referred to as UHPLC. In the present study, the gradient peak capacity limits and production speeds that can be achieved by combining both advancements have been investigated.

More specifically, we assessed the gradient performance of prototype Kinetex columns packed with 2.6 µm superficially porous (core-shell) particles, designed to withstand operating pressures up to 1200 bar. The gradient-performance limits are visualized using kinetic plots of the analysis time versus the peak capacity. The gain in performance is further demonstrated and validated with separations of complex small MW mixtures containing waste water pollutants, alkyl phenones and parabenes after column-length optimization (column coupling). In addition, the enhanced peak capacity per given time is also demonstrated for the case of tryptic digest mixtures.