

Evaluation of Highly Stable Zwitterionic HILIC Columns Based on Hybrid Organic/Inorganic Particles

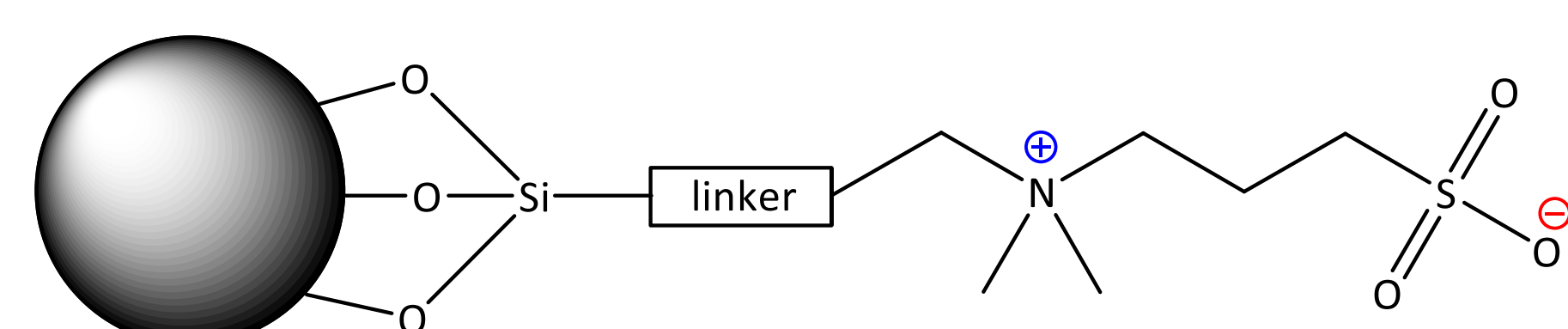
FP 463

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Introduction

- Hydrophilic Interaction Chromatography (HILIC) is widely used for separating polar analytes, such as those encountered in many metabolomics studies.
- Among HILIC stationary phases, zwitterionic materials employing sulfobetaine groups have proven to have the broadest utility.
- Many existing sulfobetaine columns suffer from poor stability in basic mobile phases, high batch-to-batch variability and/or low recoveries of metal-sensitive analytes.
- To address these challenges, we developed a new sulfobetaine stationary phase on ethylene-bridged hybrid (BEH™) organic/inorganic particles and packed it into column hardware modified using MaxPeak™ Premier Technology.
- Here, we compare these new columns (Atlantis™ Premier BEH Z-HILIC Columns) to other sulfobetaine columns.



Structure of the sulfobetaine stationary phase for Atlantis Premier BEH Z-HILIC Columns

Experimental

See Waters application note 720007311, "Introducing Atlantis BEH Z-HILIC: a Zwitterionic Stationary Phase Based on Hybrid Organic/Inorganic Particles", July 2021

Results

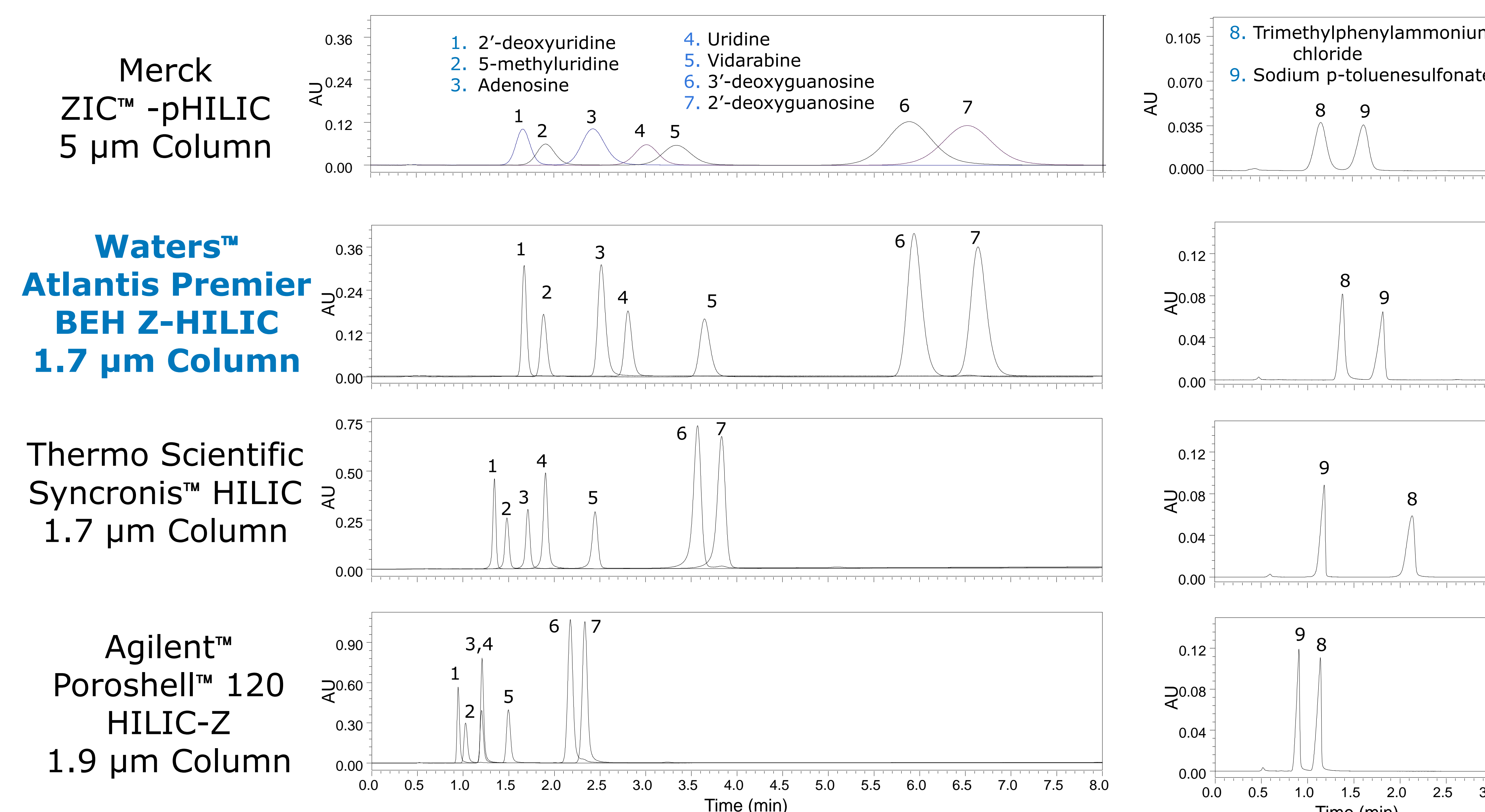


Figure 1. Chromatograms comparing the retention and selectivity of four 2.1 x 50 mm sulfobetaine columns

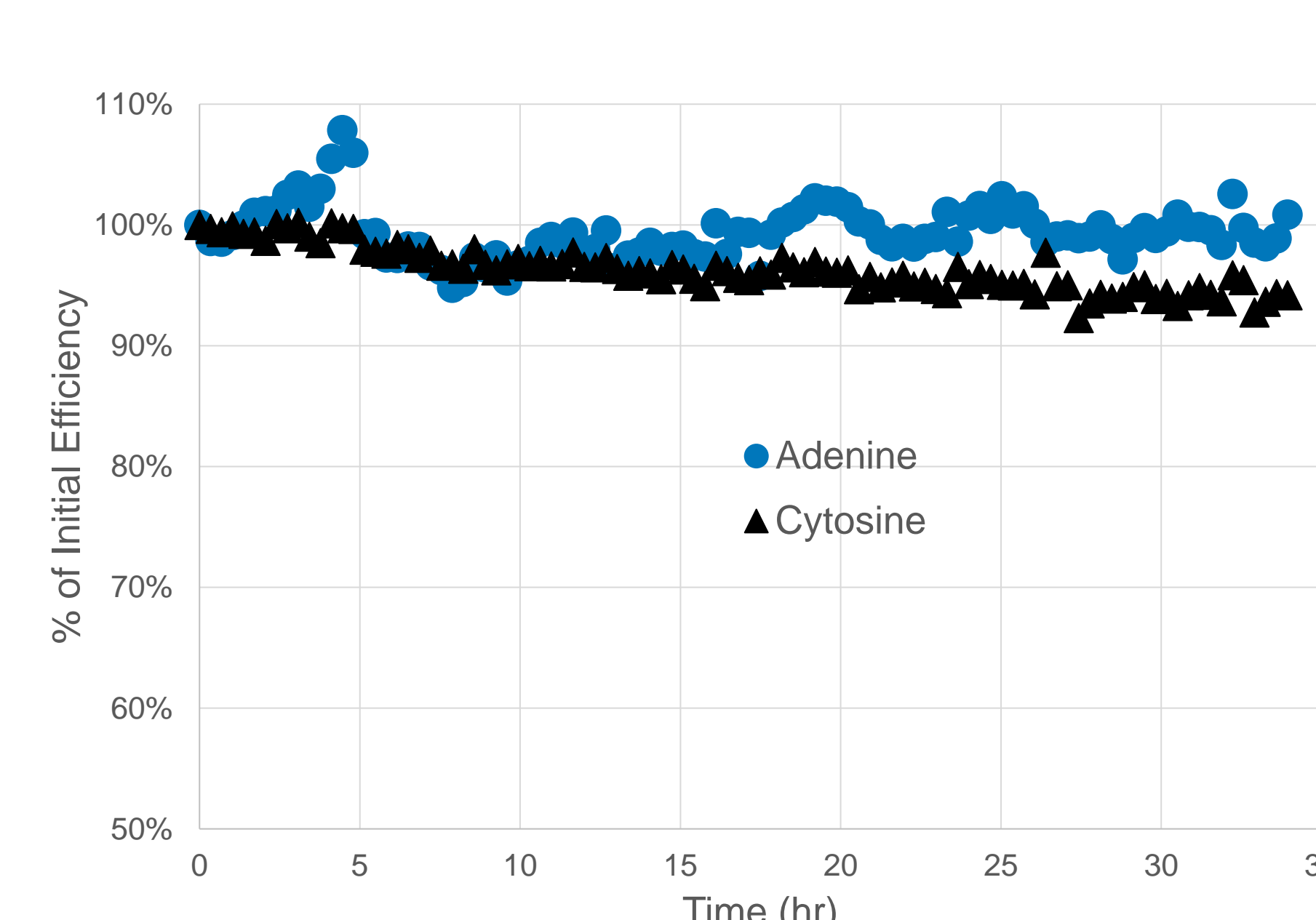


Figure 2: Stability at pH 11/70°C for an Atlantis Premier BEH Z-HILIC 1.7 μm 2.1 x 50 mm Column

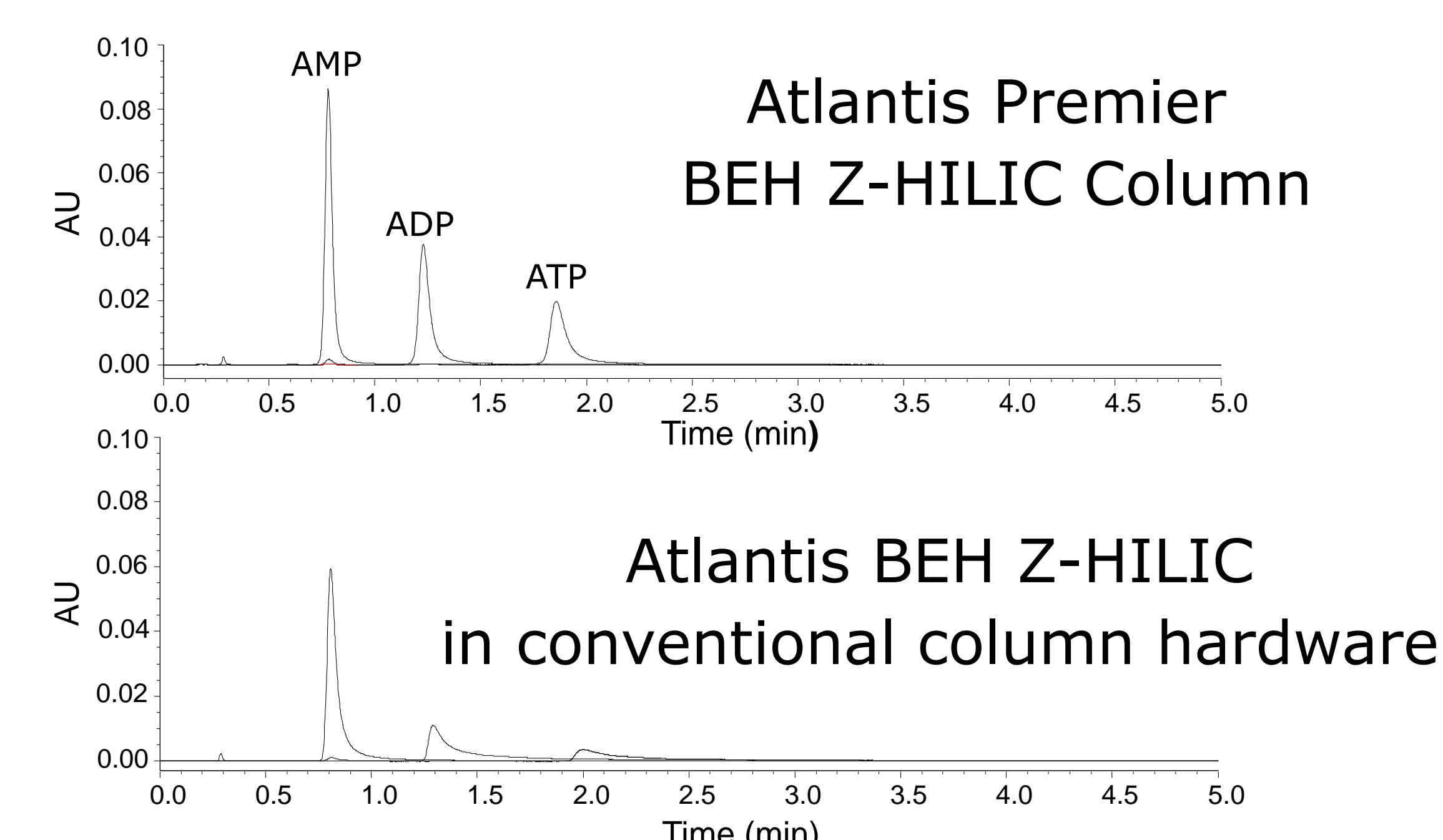


Figure 3: Performance for metal-sensitive analytes for 1.7 μm BEH Z-HILIC in MaxPeak Premier Column vs conventional column hardware

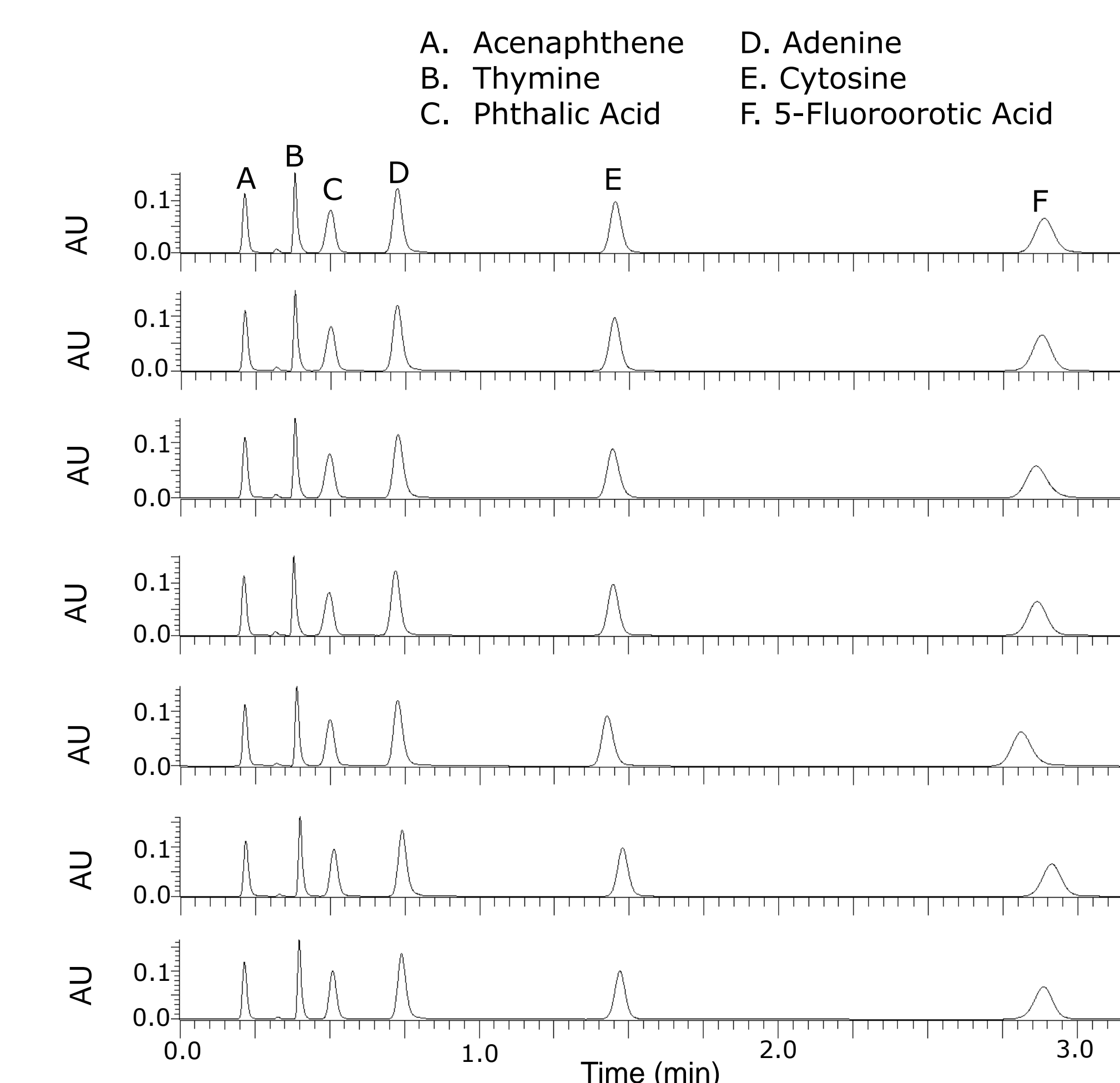


Figure 4: Chromatograms comparing the separation of a mixture of acids, bases and neutrals for seven different batches of 1.7 μm Atlantis BEH Z-HILIC stationary phase

Conclusions

- Atlantis Premier BEH Z-HILIC 1.7 μm Columns combine:
 - Strong retention of polar compounds
 - Stability from pH 2 – 10
 - High efficiency (245,000 plates/m)
 - Good batch-to-batch reproducibility
 - Excellent performance for metal-sensitive analytes
- This combination of attributes makes Atlantis Premier BEH Z-HILIC Columns particularly well-suited for polar metabolomics assays.

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