INTRODUCTION

During the last few years instrument and column manufacturers introduced several new approaches to improve performance in HPLC practice. Instrumentation for high temperature isothermal and thermal gradient LC and recently an extended pressure limit (15000 PSI, 1000 atm), low dispersion Ultra Performance Liquid Chromatography (UPLC) instrument became available. A new generation of small particle packed columns (~2.0 µm) are now available from several manufacturers to accommodate the need for shorter analysis time and better performance. This presentation gives an overview of different liquid chromatography techniques. It compares performance that can be achieved under traditional HPLC, High Temperature LC and high pressure, liquid chromatography techniques. It compares advantages and challenges of these techniques are compared. The physico-chemical properties of small particles and the chromatographic performance of small particle packed columns are presented.

COMPARISON OF UC TECHNIQUES

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SUMMARY

Experimental data demonstrated the advantages of using small particles (<2.0 µm) in packed columns. The efficiency and peak capacity in combination with speed of separation can be improved under UPLC conditions compared to traditional HPLC. Reduced plate heights (2.0-2.5) typical for 3-10 µm particle packed columns could be routinely achieved in high pressure applications. A limited selection of stationary phases with < 2.0 µm particle size is available at this point on the market. The performance of small particle packed columns varies from vendor to vendor.

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Chromatograms Obtained on 1.7, 3.5 and 5.0 µm Particle Packed and on a Monolith Column at Optimum Flow Rate (Fo)

Stability of 1.7 µm Particle Packed Columns Under Fast Gradient Conditions

Sensitivity to Extra-column Contribution

Chromatographic Performance of 1.7, 3.5 and 5 µm Particle Packed Columns and Monolith