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# Pore Size Effect of Mesoporous Silica Stationary Phase on the Separation Performance of Microfabricated Gas Chromatography Columns

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## **Highlights**

- A semi-packed micro GC column has been fabricated by MEMS technique.
- Mesoporous silica is an effective  $\mu$ GC stationary phase to separate alkanes.
- Larger pore size of stationary phase leads to longer retention time.

## **Abstract**

Microfabricated semi-packed gas chromatography (GC) columns coated with two kinds of mesoporous silica (MS) stationary phase have been explored and compared in this paper. The micro GC ( $\mu$ GC) columns are fabricated by microelectromechanical system (MEMS) technique. MSs with pore size of 2 and 5 nm are prepared using two different soft-templates and deposited on the inner surface of the  $\mu$ GC columns by dip-coating. For the first time, the influence of pore size of MS stationary phase on the separation performance in a  $\mu$ GC column has been investigated. As demonstrated, the mixtures of light alkanes (C1-C4) or heavy alkanes (C5-C10) can be well separated in both columns, where the separation resolution is always higher than 1.25 except for C1-C2 and C5-C6. Considering the pore size effect on the separation performance, it is

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