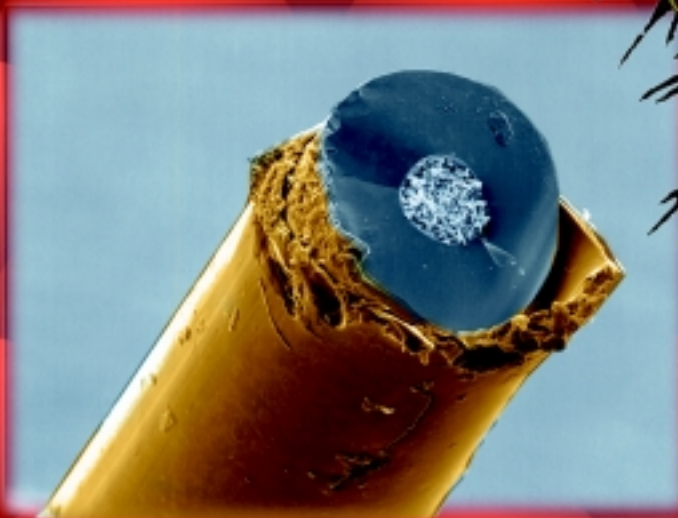
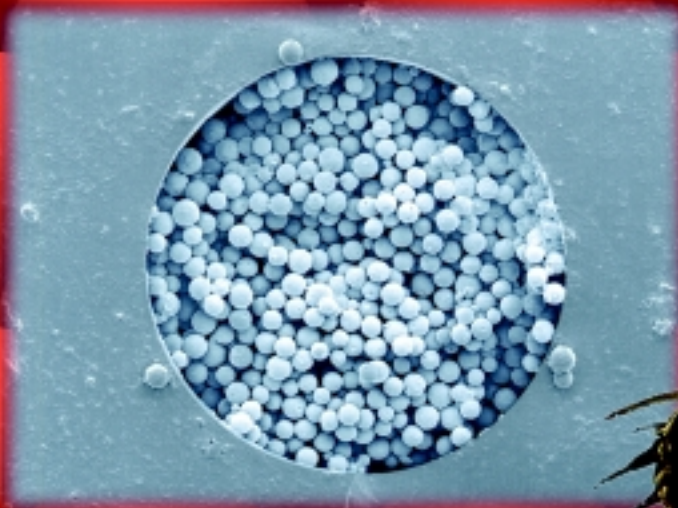
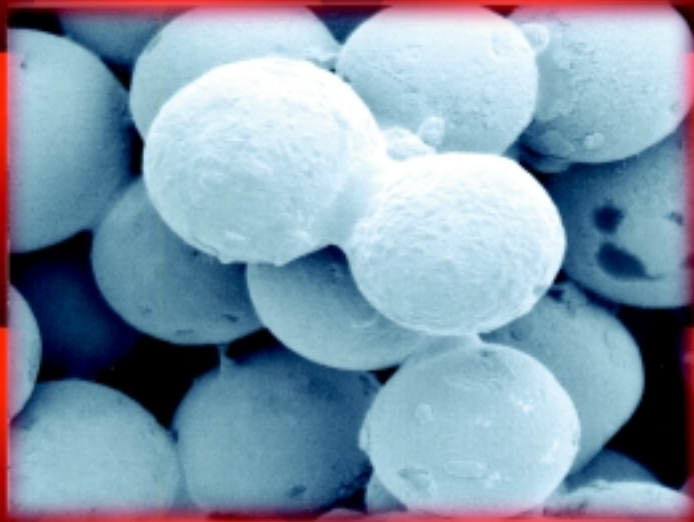


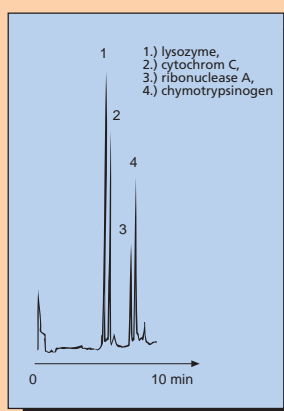
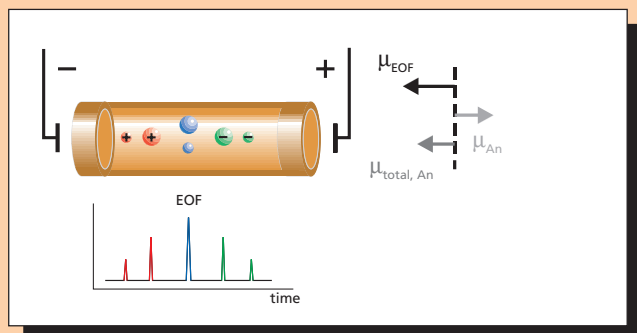
Capillary-Electrochromatography



Figures show hydro-thermally sintered frit

Capillaries for Capillary Electrophoresis (CE)

Capillary Zone Electrophoresis (CZE)



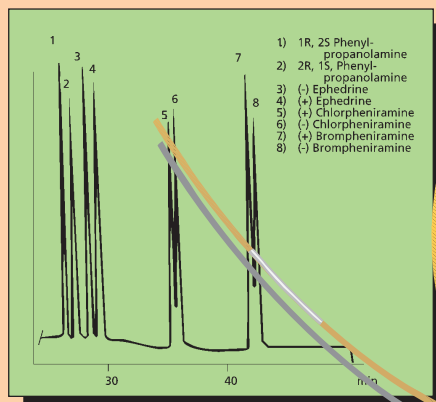
Capillary: GROM FuSi deactivated, 650 mm x 50 μm, **Buffer:** 0.1 M Na-phosphat, pH 6.0, **Operating Voltage:** 30 kV, **Detection (UV):** 280 nm, **Injection:** (el. migr.) 12 kV for 3 sec., **Sample:** ~ 5 mg/ml

All **GROM** FuSi-capillaries are manufactured, resp. formed from high strength, fused silica. They are coated with a protective polyimide-coating for high mechanical strength. This prevents breakage during handling. There are two types of uncoated capillaries available: The **untreated capillaries** feature a high degree of free silanol groups for enhanced EOF.

β-Cyclodextrine-Coated Capillaries

The **GROM** FuSi β-cyclodex 100 is a fused silica capillary with a β-cyclodextrine phase permanently **bonded** to its inner-surface. Thus, the cyclodextrine acts as a selective complexing system. Inclusion complexes are formed by molecular species able to

penetrate into the cavity of the cyclodextrine. Therefore, this capillary column permits separations of a huge variety of optical and positional isomers by HPCE. Its use has also shown to be effective in the resolution of pharmaceutical enantiomers and inorganic ions.



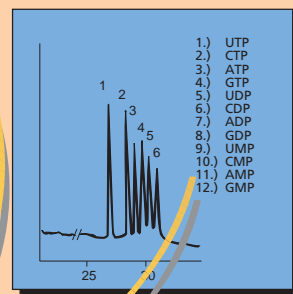
Capillary GROM FuSi β-cyclodextrine coated, 650 mm x 50 μm, **Buffer:** 0.1 M triethanolamine-phosphate, pH 2.5, 200 mg β-cyclodextrine, 5% ACN, 25% MeOH, **Operating voltage:** 30 kV, **Temperature:** 25°C, **Detection (UV):** 250 nm each, **Injection:** 1 sec (vac.), **Sample:** ~ 350 μg/ml

They are excellent for dynamic- or custom, permanent coating. The **deactivated capillaries** however are optimized to reduce the wall adsorption caused by active silanol sites and thus yield highly reproducible results for instance when analysing proteins or peptides in non-denaturing conditions.

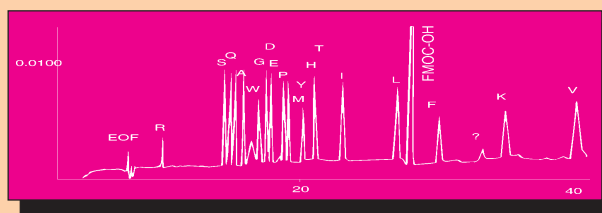
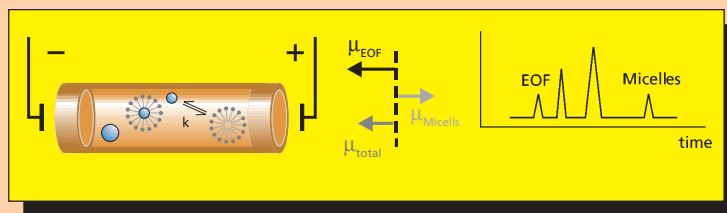
Polyethylene Glycol Coated capillaries

Capillary GROM FuSi PEG-tris-methoxysilane coated – 650 mm x 25 μm, **Buffer** 50 mM Tris-phosphate / pH 5.5, **Operating voltage** 30 kV, **Detection** 254 nm, **Injection** (el. migr.) 12 kV for 3 sec, **Sample** ~ 15 mg/ml

The **GROM** FuSi PEG 100 is a polymer coated fused silica capillary for the analysis of proteins, peptides, nucleotides etc. by capillary electrophoresis. It features a weakly hydrophilic, **polyethylene glycol-100 coated** surface that exhibits low hydrogen bonding surface, i.e. reactive areas of the inner-surface of the capillaries are reduced by cross-linking the PEG phase. This prevents the reactive regions of proteins from interacting with the silanol sites and nearly eliminates the electro-osmotic flow.



Micellar Electrokinetic Capillary Chromatography



Especially **GROM** FuSi-200 HS-capillaries used for MEKC feature a chemically and hydrolytically stable, hydrophobic coating for separations by capillary electrophoresis. This slightly polar phase inhibits solute-to-surface interactions and improves the resolution of the analysis. In addition this coating diminishes the EOF permitting a wider usable range of pH and aqueous solutions to be explored during method development.

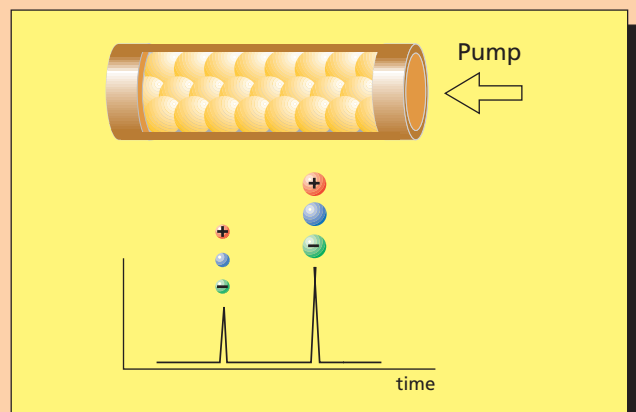
Capillary: GROM FuSi uncoated, 500 mm x 75 μm, **Buffer:** 50 mM Na-borate / 50 mM SDS, pH 9.5, 10% MeOH, **Operating voltage:** 22 kV, **Temperature:** 25°C, **Detection (UV):** 263 nm, **Injection:** 1 sec / 0.6 MPa, **Sample:** FMOH precolumn-derivatized amino acids

Capillaries for capillary electrophoresis (CE)

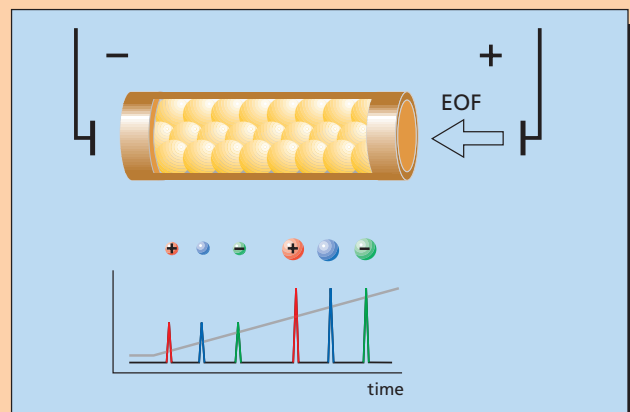
Order number	Description
CE-365050	GROM FuSi-untreated capillary, 50 μm i.d. - 360 μm o.d. - 100 cm length
CE-365075	GROM FuSi-untreated capillary, 75 μm i.d. - 360 μm o.d. - 100 cm length
CE-04250-C	GROM FuSi-deactivated capillary, 50 μm i.d. - 360 μm o.d. - 100 cm length
CE-04275-C	GROM FuSi-deactivated capillary, 75 μm i.d. - 360 μm o.d. - 100 cm length
CE-04050-PEG	GROM FuSi-PEG-100 coated capillary, 50 μm i.d. - 360 μm o.d. - 100 cm length
CE-04075-PEG	GROM FuSi-PEG-100 coated capillary, 75 μm i.d. - 360 μm o.d. - 100 cm length
CE-04050-CD	GROM FuSi-PEG-β-cyclodextrin coated capillary, 50 μm i.d. - 360 μm o.d. - 100 cm length
CE-04075-CD	GROM FuSi-PEG-β-cyclodextrin coated capillary, 75 μm i.d. - 360 μm o.d. - 100 cm length
CE-04150-HS	GROM FuSi-200 HS hydrophob., hydrolyt. stable coated capillary, 50 μm i.d. - 360 μm o.d. - 100 cm length
CE-04175-HS	GROM FuSi-200 HS hydrophob., hydrolyt. stable coated capillary, 75 μm i.d. - 360 μm o.d. - 100 cm length

Columns for Capillary Electrochromatography (CEC)

Capillary HPLC



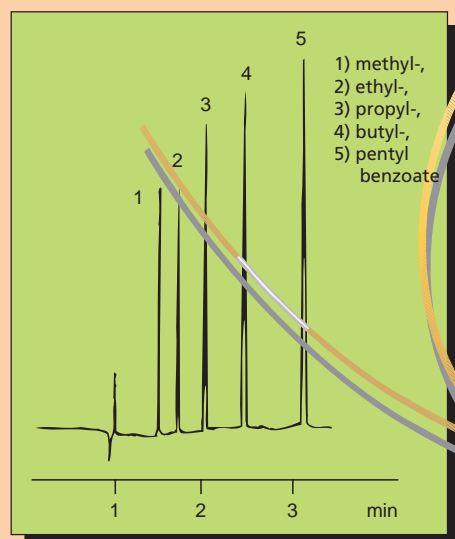
Gradient Electrochromatography



Electrochromatography represents one of the most exciting, recent developments in the field of separation technologies. This unique method combines all the outstanding features and benefits inherent in modern HPLC and advanced capillary electrophoresis. It is readily performed in either the isocratic or in the gradient mode. Exceptional separations can thus be achieved when employing capillaries ≤ 150 mm in length packed either with porous or non-porous micro-particles. The electro osmotic flow eliminates restrictions in the length of the column normally encountered with small particle-sized packings as the result of prohibitively high back-pressures.

References: B. Behnke, E. Grom, E. Bayer, Journal of Chromatography A 716, 207–213 (1995)
B. Behnke, E. Bayer, Journal of Chromatographie A 680, 93–98 (1994)

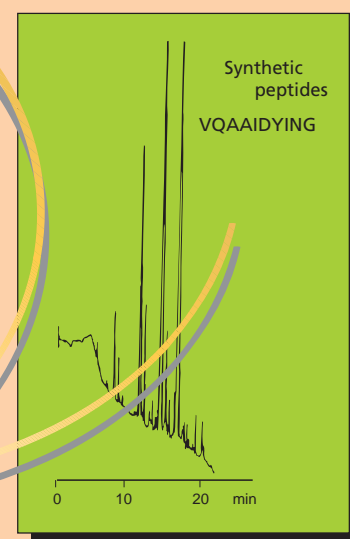
Isocratic Capillary Electrochromatography



Stationary phase:
GROM SIL 100
ODS-2 FE, 1,5 μ m
GROM CEC Column
400 mm (150 mm)
x 100 μ m
Operating voltage:
20 kV
Eluent A: 80% ACN
20% Buffer
(5 mM Sodium-phosphate, pH 8)
Detection (UV):
254 nm
Injection: (el. migr.)
12 kV for 3 sec.
Sample: benzoate test mixture

Stationary phase:
GROM SIL 100
ODS-2 FE, 1,5 μ m
GROM CEC Column
400 mm (150 mm)
x 100 μ m
Operating voltage:
30 kV
Eluent A: 0.1g/l
TFA
Eluent B: ACN
Gradient: 0–95% B
(0–20 min)
Detection (UV):
220 nm,
Injection: (el. migr.) 12 kV for 3 sec.
Sample: synthetic peptides

Gradient Capillary Electrochromatography



The **NovoGROM** capillary columns for CEC are available with inner diameters of 25 μ m, 50 μ m, 75 μ m, 100 μ m and 150 μ m. They can be packed with any of the stationary phases listed in the **GROM-HPLC** catalogue or with the customer's stationary phase.

Acknowledgements: Results and chromatograms presented were kindly provided by B. Behnke, Inst. f. Org. Chem., University of Tübingen, Germany
J. Räder and S. Webeler, Dept. f. Biotech., Fachhochschule Niederrhein, Krefeld, Germany

Capillary columns for electrochromatography (CEC)

Order number	Description
***.....2534100	GROM CEC-capillary column 250 (340) x 0,1 mm
***.....4049100	GROM CEC-capillary column 400 (490) x 0,1 mm
***.....	GROM CEC-capillary columns are also available in other dimensions, please call for more informations

Standard for
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