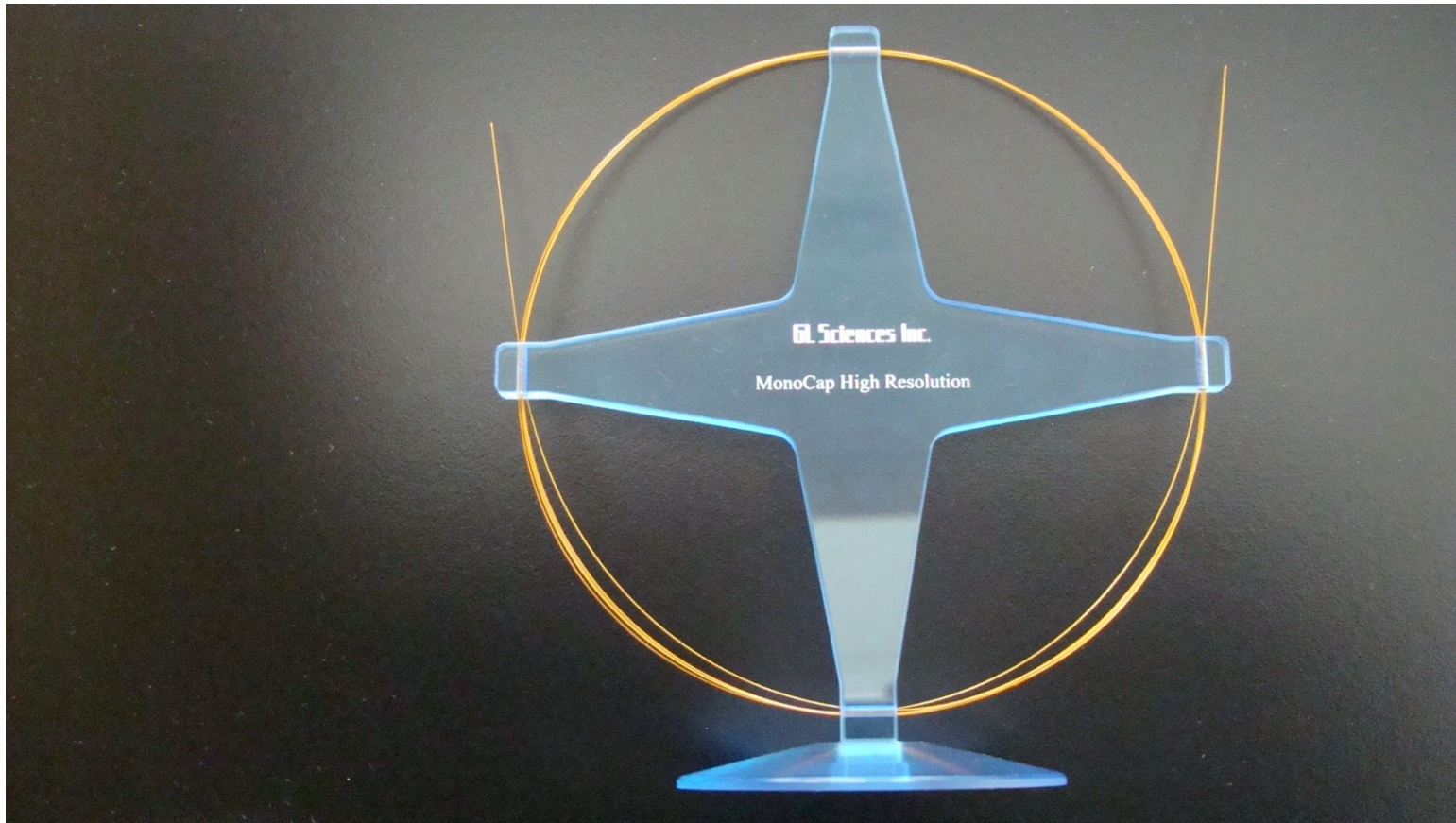


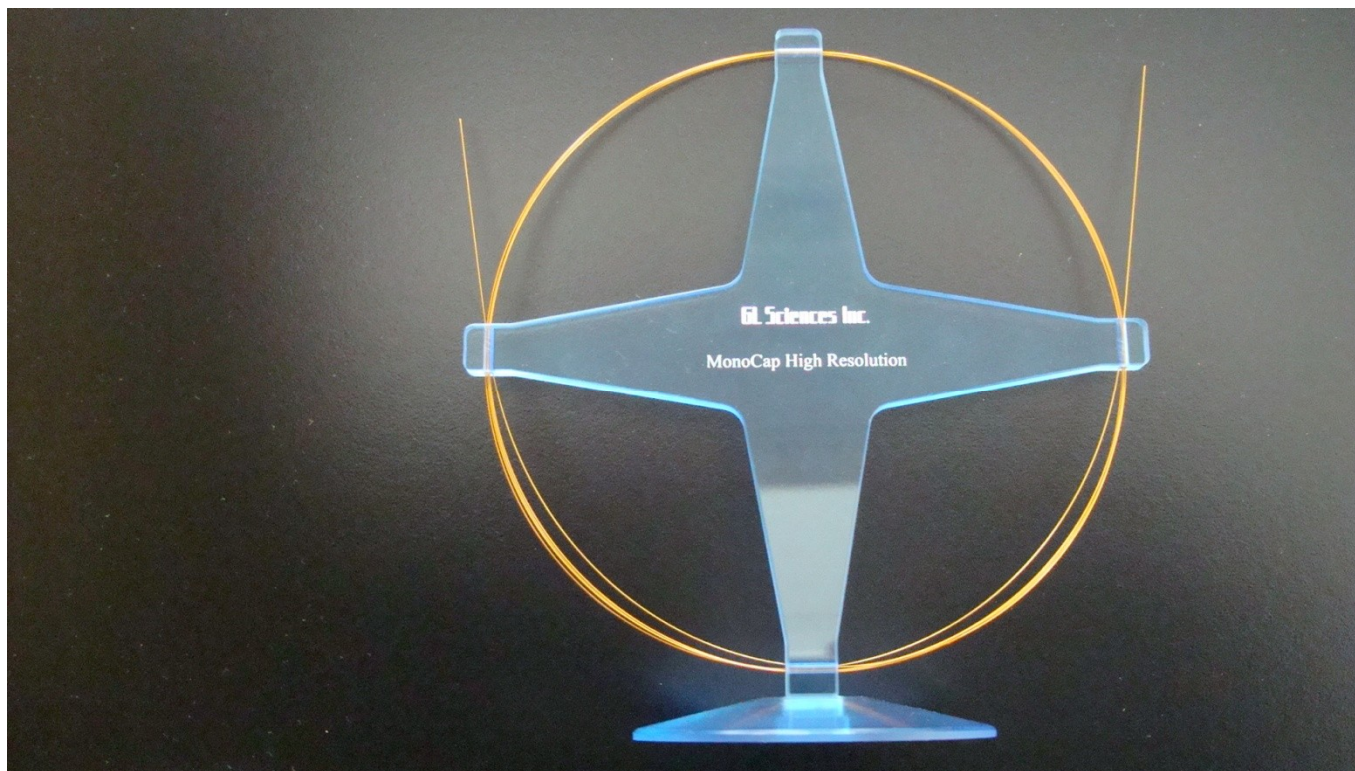
MonoCap HighResolution 2000 Series



***Optimized for Identification of Peptides /Proteins
for Proteome Research***

What is MonoCap HighResolution 2000 ?

MonoCap HighResolution 2000 is a 2 meter length monolithic silica capillary column which is designed for identifying extremely high number of peptides/proteins for proteome research via LC-MS/MS.



Physical Properties of MonoCap HighResolution 2000

MonoCap C18 HighResolution 2000

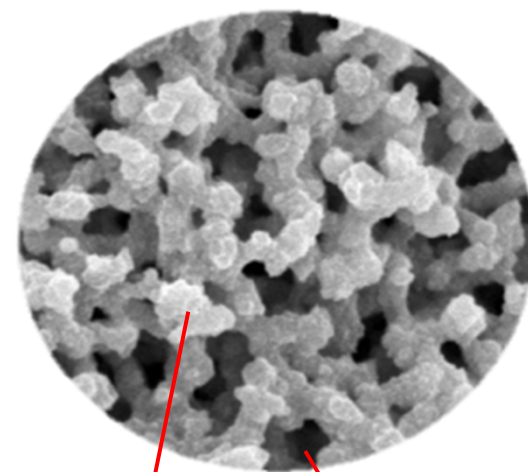
Silica	: High Purity Monolithic Silica Gel
Through-pore Size	: 2 μm
Mesopore Size	: 15 nm
Bonded Phase	: Octadecyl Groups
End-capping	: Yes
Internal Diameter	: 0.1 mm I.D.
Length	: 2000 mm
Recommended Flow Rate Ranges	: 0.3 $\mu\text{L}/\text{min}$ ~ 1 $\mu\text{L}/\text{min}$
Maximum Operating Pressure	: 35 MPa, 300 Bar

MonoCap HILIC-UP HighResolution 2000

Silica	: High Purity Monolithic Silica Gel
Through-pore Size	: 2 μm
Mesopore Size	: 12 nm
Bonded Phase	: Ureidopropyl Groups
End-capping	: None
Internal Diameter	: 0.1 mm I.D.
Length	: 2000 mm
Recommended Flow Rate Ranges	: 0.3 $\mu\text{L}/\text{min}$ ~ 1 $\mu\text{L}/\text{min}$
Maximum Operating Pressure	: 35 MPa, 300 Bar

Remarks : For identification of highly hydrophobic peptides/proteins

Bimodal Pore Structure of MonoCap



Mesopores

Through-pores

Why Use MonoCap HighResolution 2000 columns?

<u>Facts</u>	MonoCap HighResolution 2000 mm columns	Traditional Particle Packed 150 mm columns
Separation Efficiency	Higher	Lower
Number of Identified Peptides	More	Less
Total Operation Time	Shorter	Longer
Operating Pressure	Lower	Higher
Column Lifetime	Longer	Shorter
Total Cost including all the above factors	Less	More

Performance of MonoCap C18 HighResolution 2000

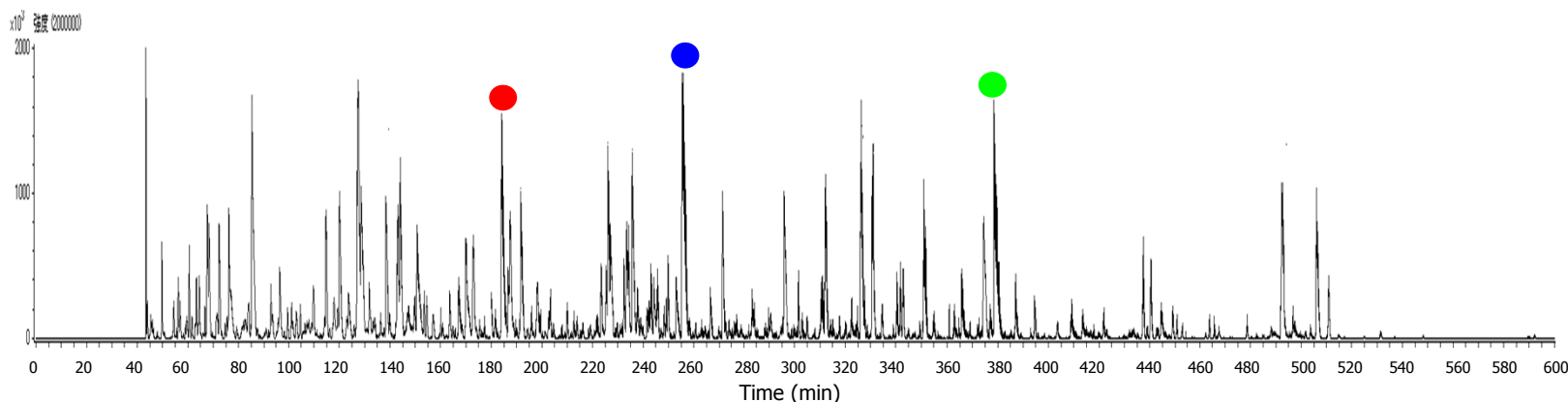
MS: LTQ-Orbitrap XL (Mascot Search)
Sample: THP-1 Cell Lysate Tryptic Digest, 5 µg

Column Name	Number of Identified Proteins in average	Analysis Time
MonoCap C18 HighResolution 2000 0.1 mm I.D. x 2000 mm	2,087 (2013, 2116, 2131)	10 Hours
Particle packed column 0.1 mm I.D. x 150 mm	680 (685, 679, 675)	2 Hours

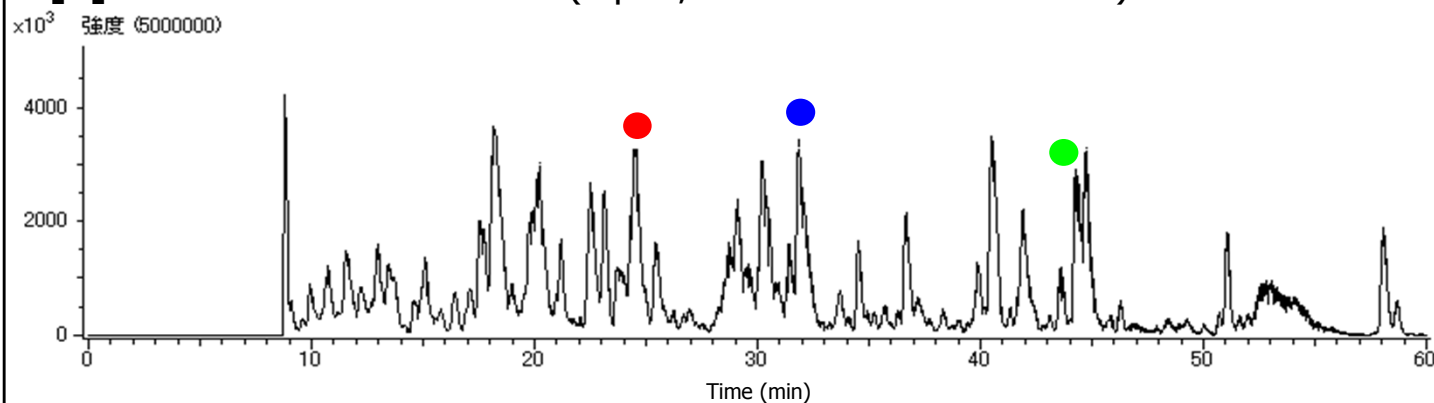
All data were acquired, provided by our customer

Performance of MonoCap C18 HighResolution 2000

[1] MonoCap C18 HighResolution 2000 (2000 mm x 0.1 mm I.D.)



[2] Particle Packed column (3 μ m , 150 mm x 0.075 mm I.D.)



● ● ● are analytes having the same molecular weight

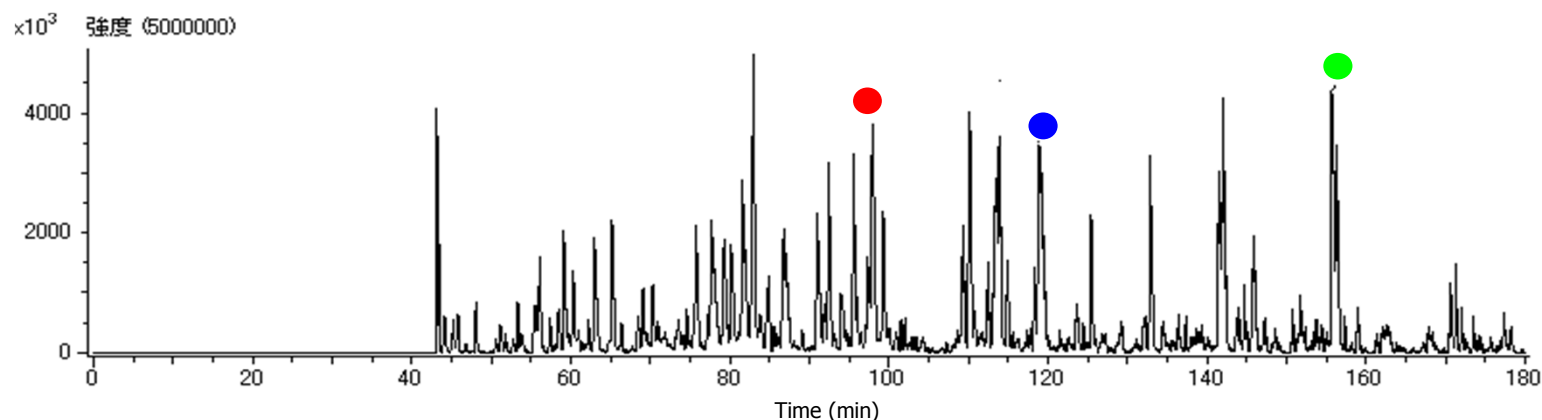
Conditions

System : GLS Capillary HPLC system
 Column : [1] MonoCap C18 High Resolution 2000 (2000 mm x 0.1 mm I.D.)
 : [2] Particle packed column (3 μ m, 150 mm x 0.075 mm I.D.)
 Trap column : MonoCap C18 Trap Column (50 mm x 0.075 mm I.D.)
 Eluent : A) 0.1 %HCOOH in CH₃CN
 B) 0.1 %HCOOH in H₂O
 [1] A / B = 10 / 90 - 600 min - 45 / 35
 [2] A / B = 10 / 90 - 180 min - 45 / 55

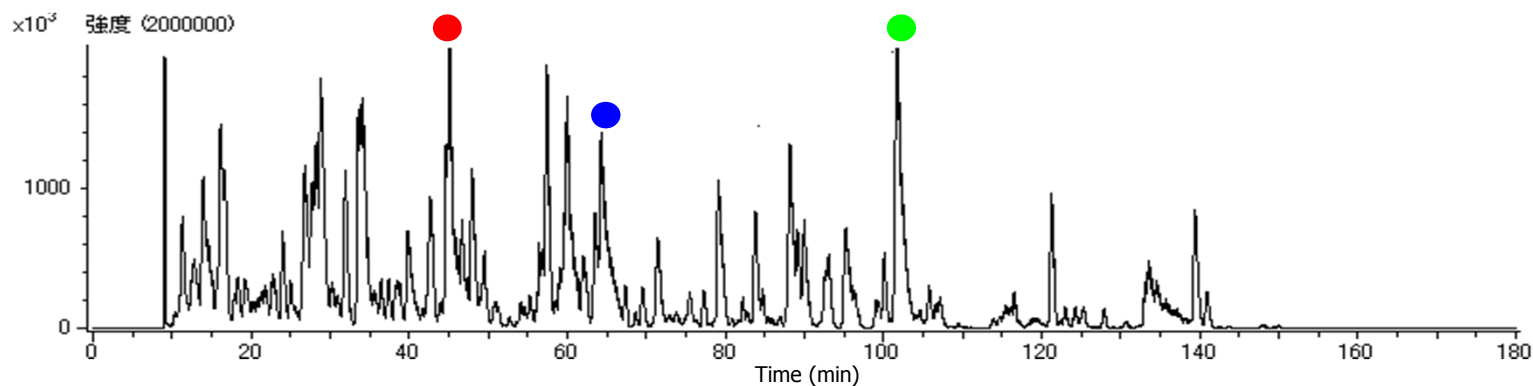
Flow Rate : [1] 0.5 μ L/min
 : [2] 0.3 μ L/min
 Injection Vol. : 5 μ L
 Detection : MS (TIC m / z 500 - 1500)
 Sample : Tryptic digest of proteins

Performance of MonoCap C18 HighResolution 2000

[1] MonoCap C18 HighResolution 2000 (2000 mm x 0.1 mm I.D.)



[2] Particle Packed column (3 μ m , 150 mm x 0.075 mm I.D.)



● ● ● are analytes having the same molecular weight

Conditions

System : GLS Capillary HPLC system

Column : [1] MonoCap C18 High Resolution 2000 (2000 mm x 0.1 mm I.D.)

: [2] Particle packed column (3 μ m, 150 mm x 0.075 mm I.D.)

Trap column : MonoCap C18 Trap Column (50 mm x 0.075 mm I.D.)

Eluent : A) 0.1 %HCOOH in CH₃CN

B) 0.1 %HCOOH in H₂O

[1] A / B = 10 / 90 - 600 min - 45 / 55

[2] A / B = 10 / 90 - 180 min - 45 / 55

Flow Rate : [1] 0.5 μ L/min

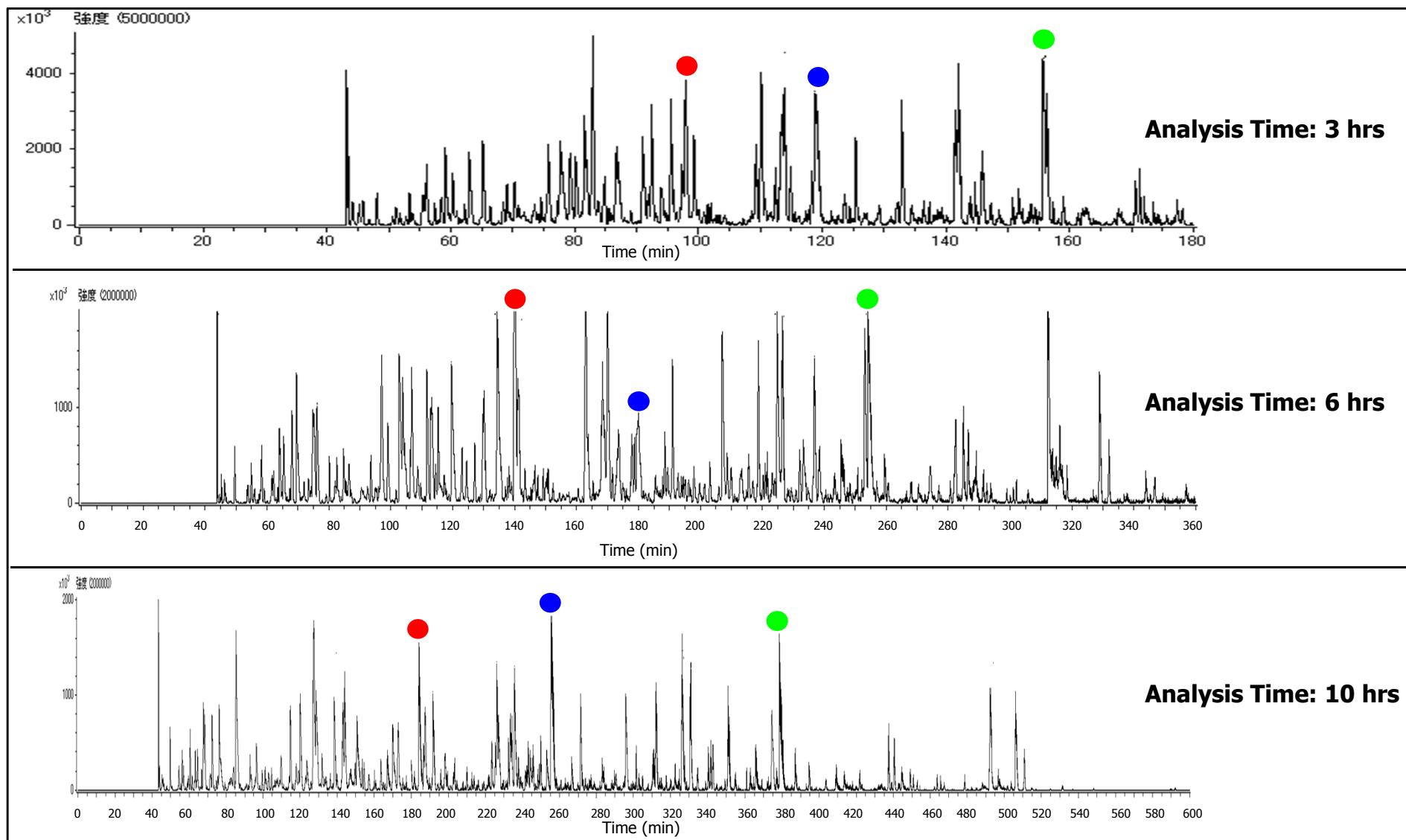
: [2] 0.3 μ L/min

Injection Vol. : 5 μ L

Detection : MS (TIC m / z 500 - 1500)

Sample : Tryptic digest of proteins

Performance of MonoCap C18 HighResolution 2000



Column : MonoCap C18 High Resolution 2000 (2000 mm x 0.1 mm I.D.)
 Trap column : MonoCap C18 Trap Column (50 mm x 0.075 mm I.D.)
 Flow Rate : 0.5 μ L/min
 Eluent : A) CH₃CN (0.1% HCOOH), B) H₂O (0.1% HCOOH)
 A / B = 10 / 90 - 180, 300, 600 min- 45/55

● ● ● are analytes having the same molecular weight

Sample : Tryptic digest of proteins
 Injection vol. : 5 μ L

Performance of MonoCap C18 HighResolution 2000

Shotgun Proteomics study using MonoCap C18 HighResolution 2000 mm

Sample: Proteins derived from rat serum, brain microsome and T Cell

5 μ L Loop Injection

[LTQ-XL]

m/z 400-1500 top5 CID

[LTQ-Orbitrap XL]

m/z 400-1500 top3 CID

[mascot search] DB: Refseq_rat, 16776 sequence (including only NP_***)**

LTQ-XL: cut off =35 pts

LTQ-OrbitrapXL: cut off=0.05

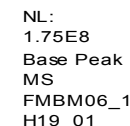
All data were acquired, provided by Astellas Pharma Inc., Mr. Hiramoto

Performance of MonoCap C18 HighResolution 2000

Particle Packed 15 cm vs MonoCap C18 HighResolution 2000 Comparison of Number of Identified Proteins

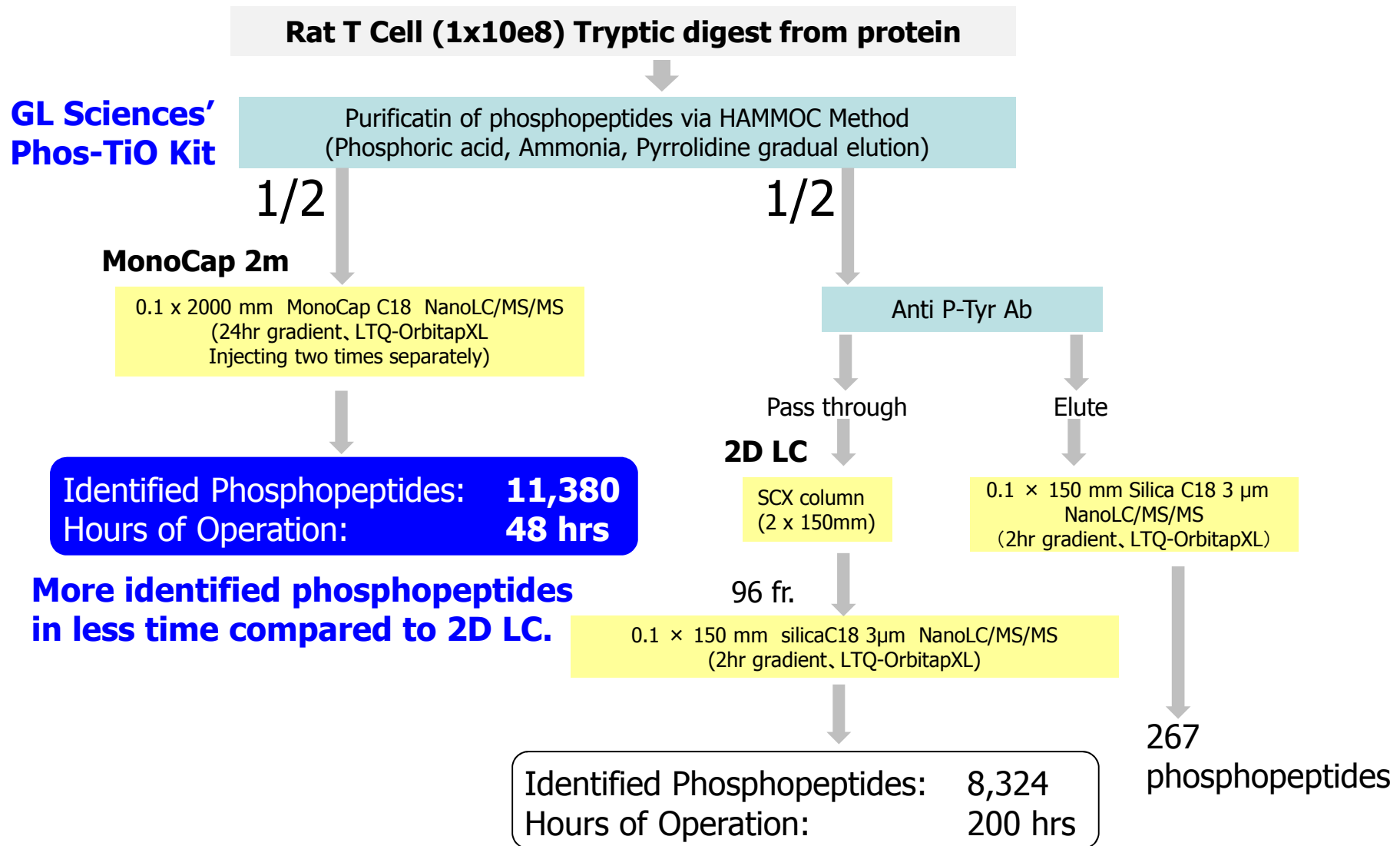
	MonoCap C18 12hr gradient LTQ-XL (Top5 CID)	MonoCap C18 6hr gradient LTQ-XL (Top5 CID)	15 cm Particle packed 2hr gradient LTQ-OrbitrapXL (Top3 CID)	Offgel fractionator (12 frs) 15cm packed 2hr OrbitrapXL (Top3 CID)
Rat brain microsome Tryptic digest ca.25 µg	1,772	1,661	915	2,800
Rat brain microsome Tryptic digest iTRAQ 5 µg	1,487	1,182	210 (Top3 HCDCID)	-
Rat serum 0.4 µL (ca. 20 µg protein) Tryptic digest	329	232	153	-

Rat brain microsome 5 μ g tryptic digest iTRAQ



Performance of MonoCap C18 HighResolution 2000

Example of 2-Dimensional LC for Phosphoproteomics

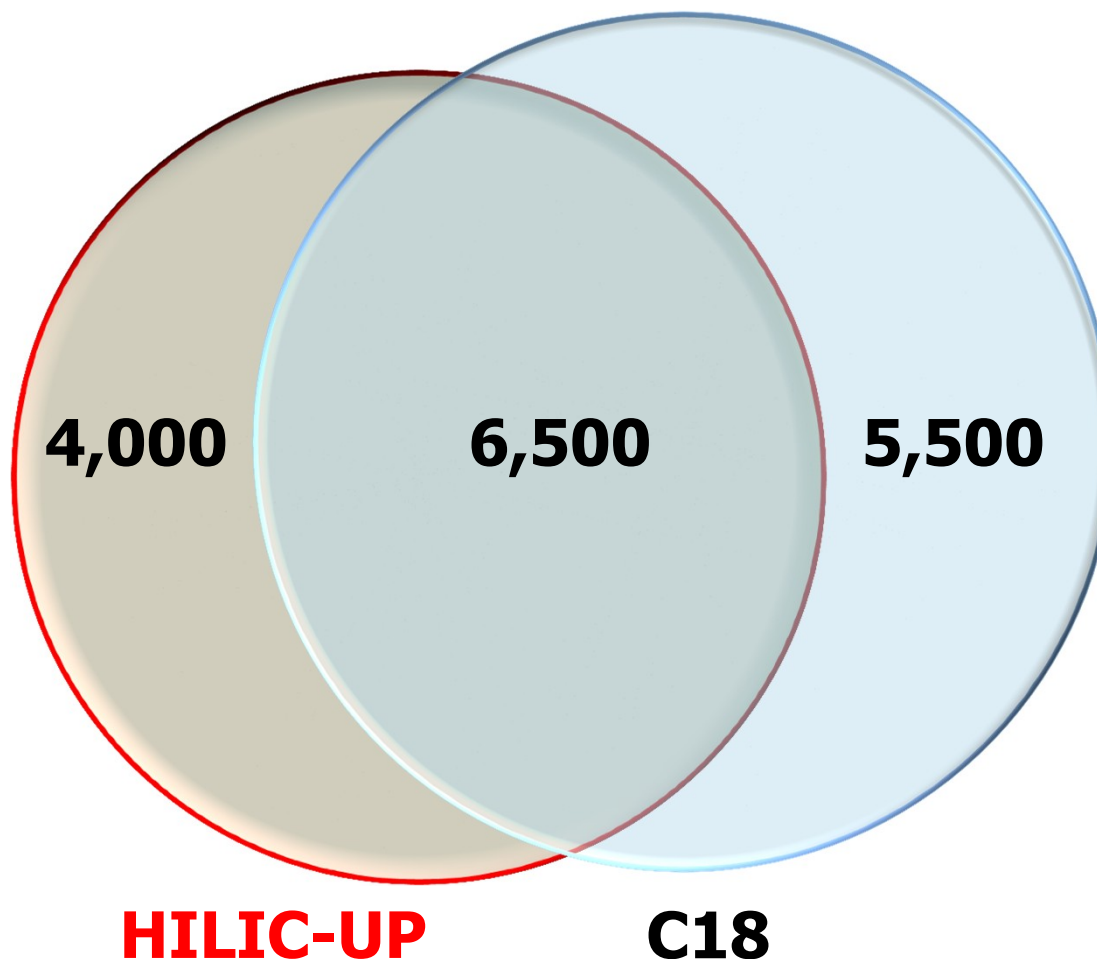


Performance of MonoCap HILIC-UP HighResolution 2000

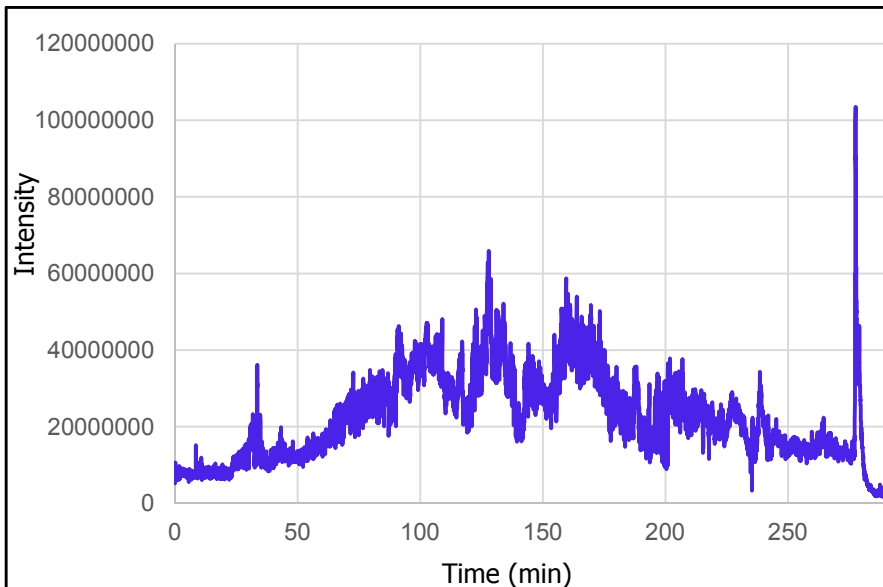
For Identification of Highly Hydrophilic Peptides / Proteins

Column Size : 2000 mm x 0.1 mm I.D.
Mass spectrometer : Triple TOF 5600
Gradient : Two Gradient Programs, 4 hrs & 8 hrs

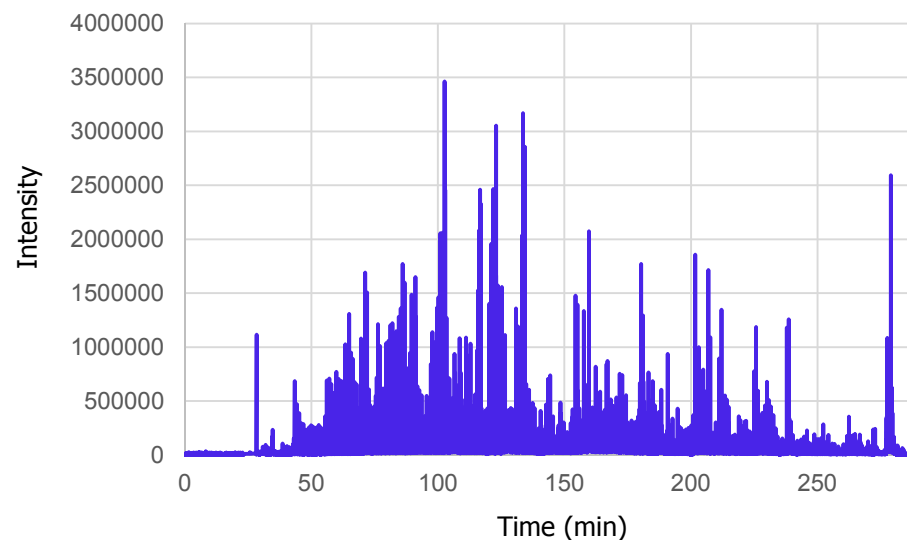
Reference:
Hydrophilic Interaction Chromatography
Using a Meter-Scale Monolithic silica capillary
Column for Proteomics LC-MS,
K Horie et al. *Anal. Chem.* 2014, 86, 3817-3824



Performance of MonoCap HILIC-UP HighResolution 2000



Total Ion Chromatogram



Base Peak Chromatogram

Conditions

Column : MonoCap HILIC-UP High Resolution 2000
Eluent : A) CH₃CN : H₂O=10/90 (0.5% CH₃COOH)
 B) CH₃CN : H₂O=95/5 (0.5% CH₃COOH)
 A/B=0/100-(240 min)-20/80-(10 min)-100/0-(10 min)-100/0
Flow Rate : 0.5 μ L
Injection Vol. : 1 μ L (1 mg/mL)
Detection : TIC MS (m/z 300-1500)
Sample : Tryptic Digest of Hela Cell Lysate, 5 ug

Reference:

Results of MonoCap C18 HighResolution 2000

Number of Identified Peptides: 8,358
Number of Identified Proteins: 1,992
Gradient Program: 4 hrs

Number of Identified Peptides : 7,194 (14736 PSM*)
Number of Identified Proteins : 2,201

***Peptide Spectrum Match**

Ordering Information

MonoCap™ C18 High Resolution 2000

I.D.(mm)	Length(mm)	Cat.No.
0.1	2000	5020-10015

- * A column stand is included.
- * End-fittings are not included.



MonoCap High Resolution 2000

Connection Kit for MonoCap™ C18 High Resolution



Connection Kit for MonoCap™ C18 High Resolution 2000

A dedicated connection kit for MonoCap C18 High Resolution 2000.

Use this connection kit when connecting the column directly to the system.

Description	Contents of Kit	Cat.No.
Connection Kit for MonoCap C18 High Resolution 2000	1/16" PEEK Ferrule, SUS Nut, Sleeve 2 pcs each 1/32" PEEK Ferrule, SUS Nut, Sleeve 2 pcs each	5020-10017

Zero Dead Volume Union

Connect the tubing from the system to this union and install the column to achieve zero dead volume.



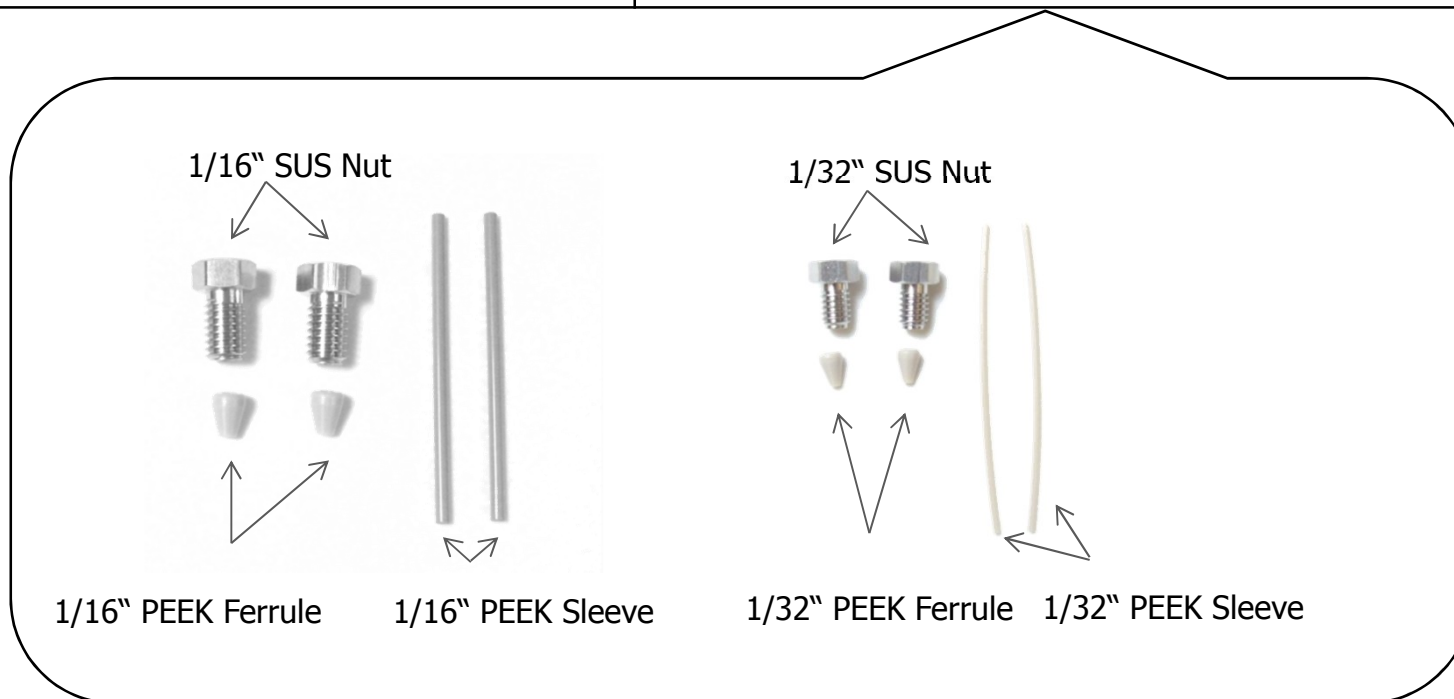
Description	Model	Remarks	Cat.No.
Zero Dead Volume Union	U-435	For 1/16" SUS Tubing	6010-72352

Column Connection

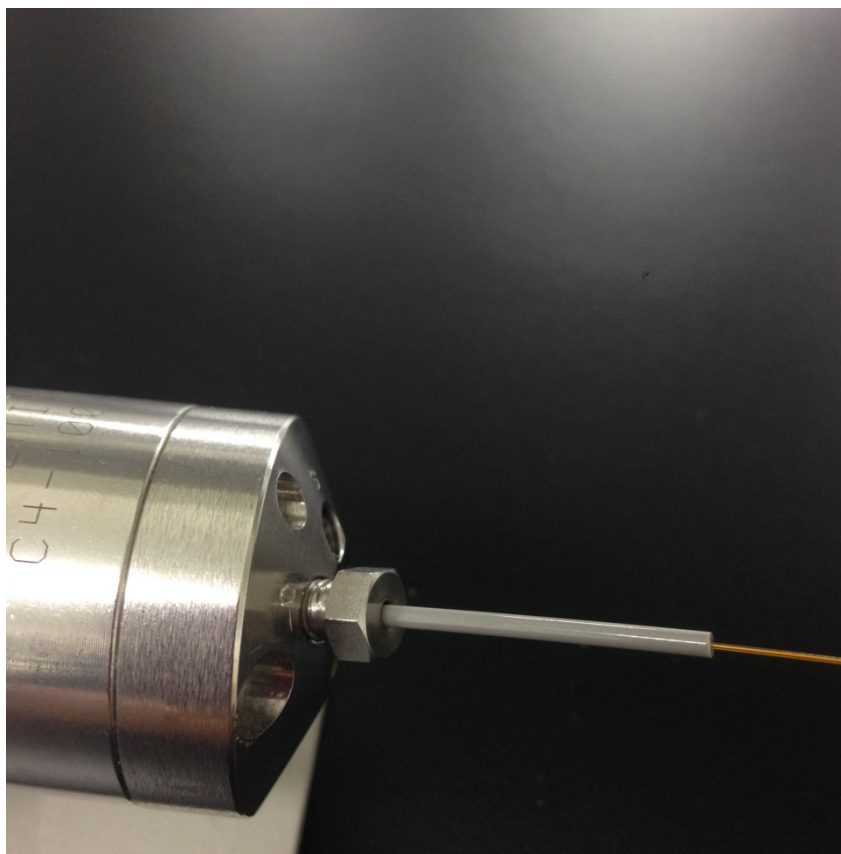
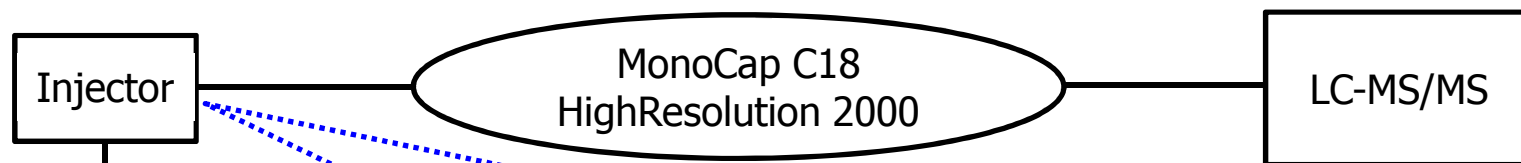
Purchase the following connection kit when directly connecting the column to the injector of a nano-LC instrument.

MonoCap C18 HighResolution 2000 Connection Kit

Description	Contents	Cat.No.
MonoCap C18 HighResolution 2000 Connection Kit	1/16" PEEK Ferrule, SUS Nut, Sleeve, 2 pcs each. 1/32" PEEK Ferrule, SUS Nut, Sleeve, 2 pcs each.	5020-10017

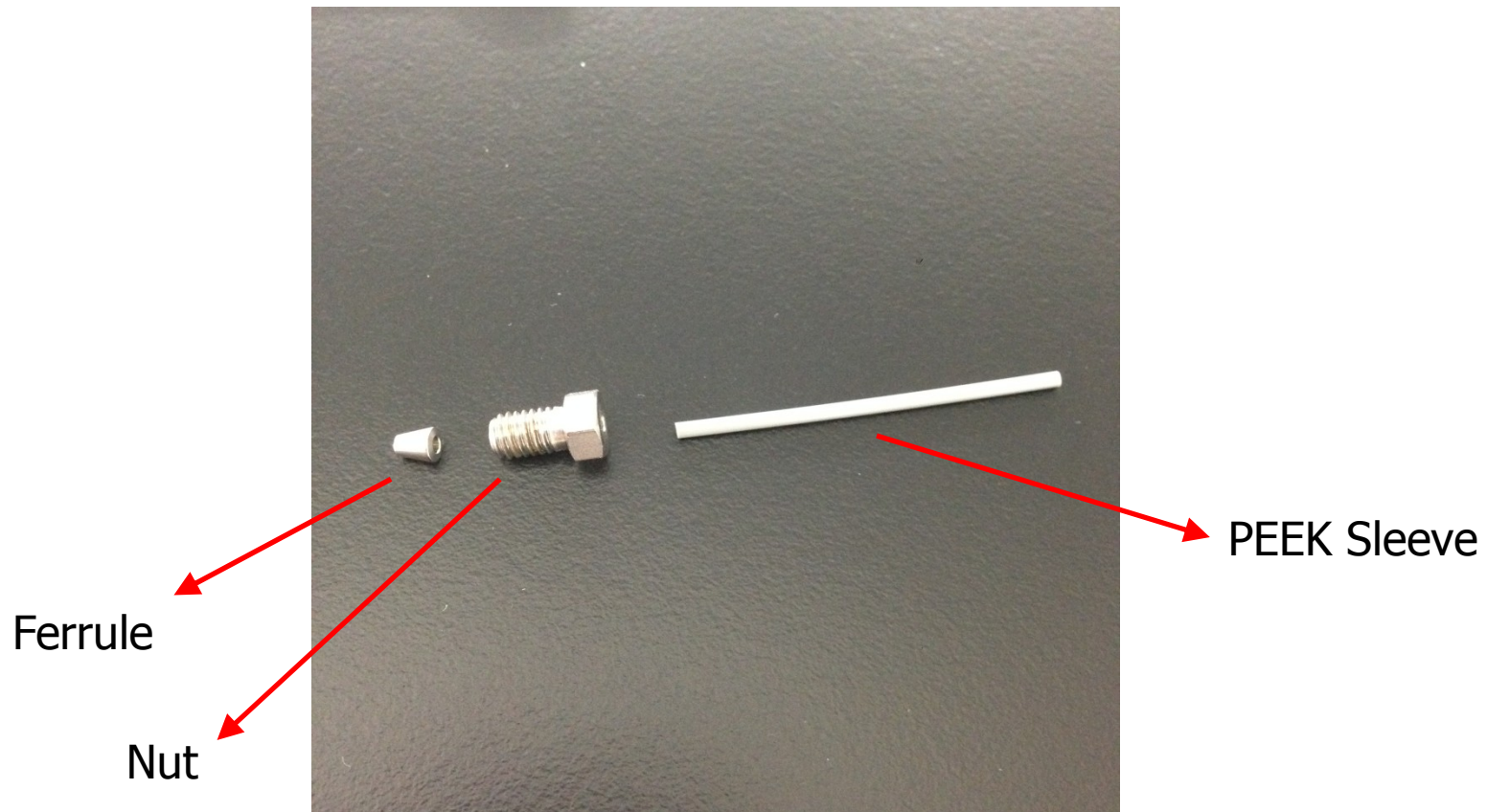


Example of Column Connection



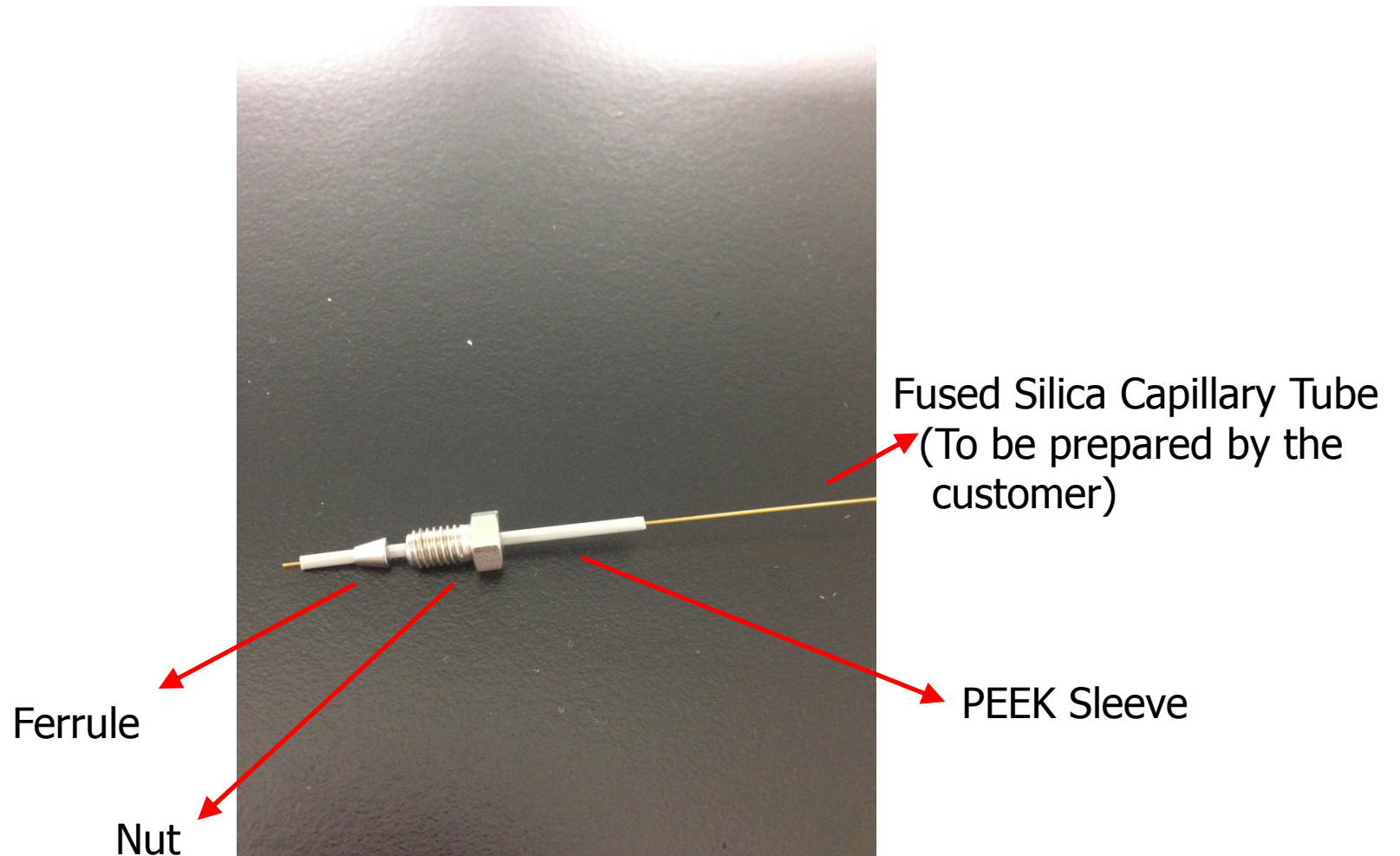
Installing MonoCap to the appropriate End-fittings

1. Prepare either 1/16" or 1/32" end-fittings and sleeve included in the MonoCap connection kit (Cat# 5020-10017).



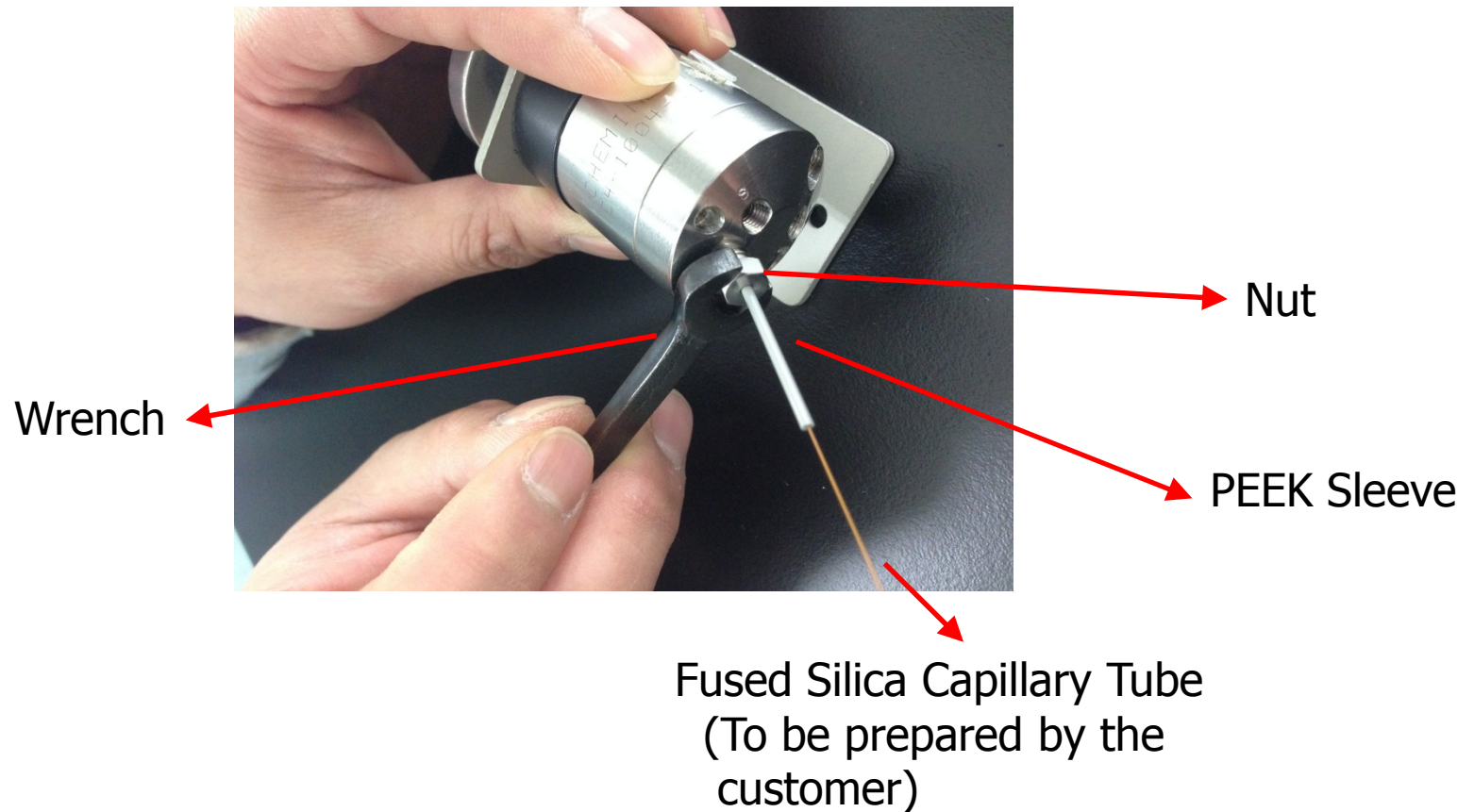
Installing MonoCap to the appropriate End-fittings

2. Insert the sleeve into a nut and ferrule. Then insert a fused silica capillary tube into the sleeve.



Installing MonoCap to the appropriate End-fittings

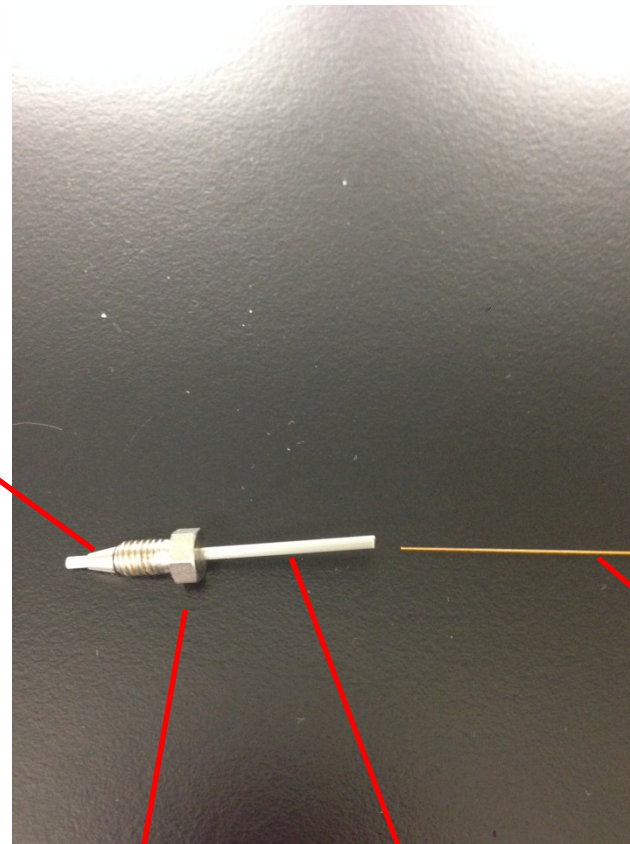
3. Insert the pre-assembled fitting into the injection port. Then tighten the nut by two or three turns using a wrench to make certain that the ferrule grabs the sleeve.



Installing MonoCap to the appropriate End-fittings

4. Now the ferrule is fixed to the sleeve. Remove the fused silica capillary tube from the sleeve.

The ferrule is now fixed to the sleeve



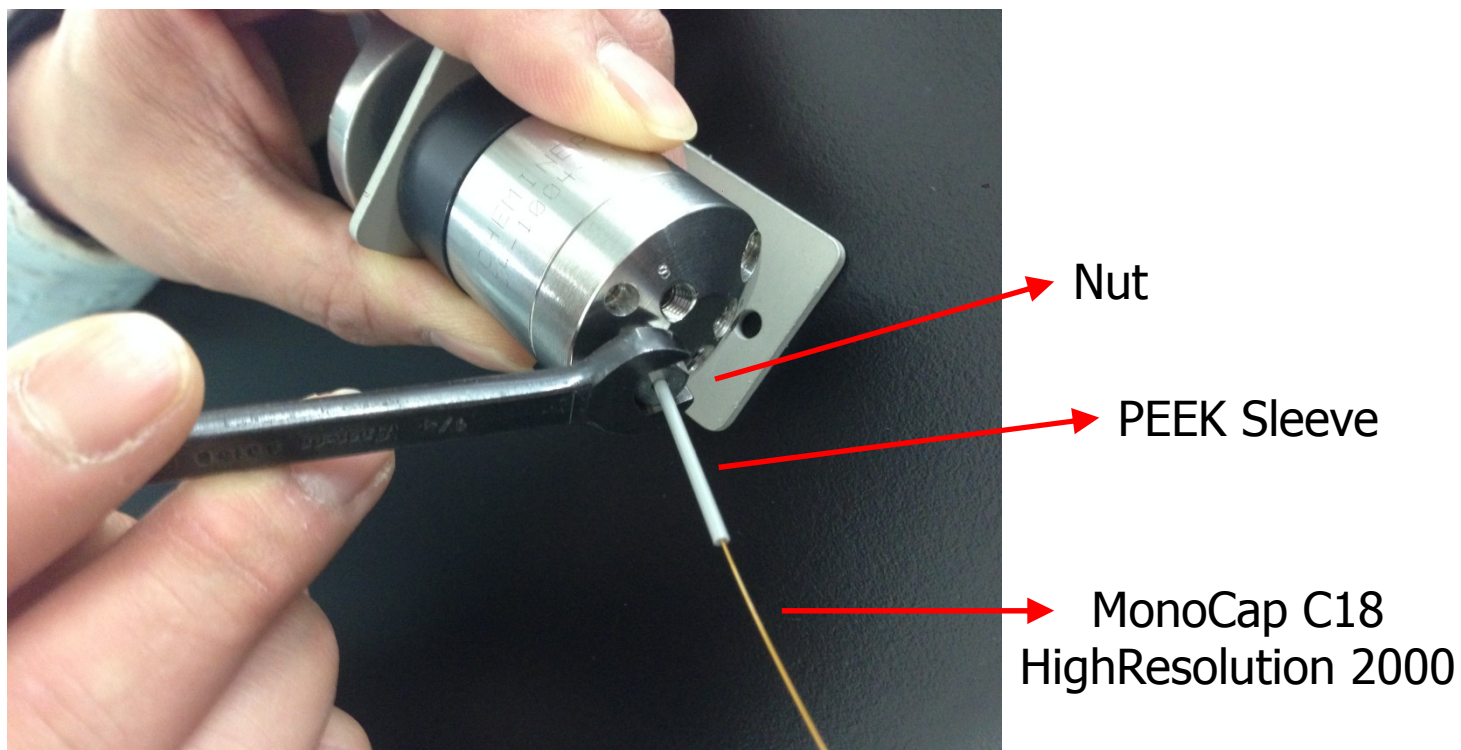
Fused Silica Capillary Tube
(To be prepared by the
customer)

Nut

PEEK Sleeve

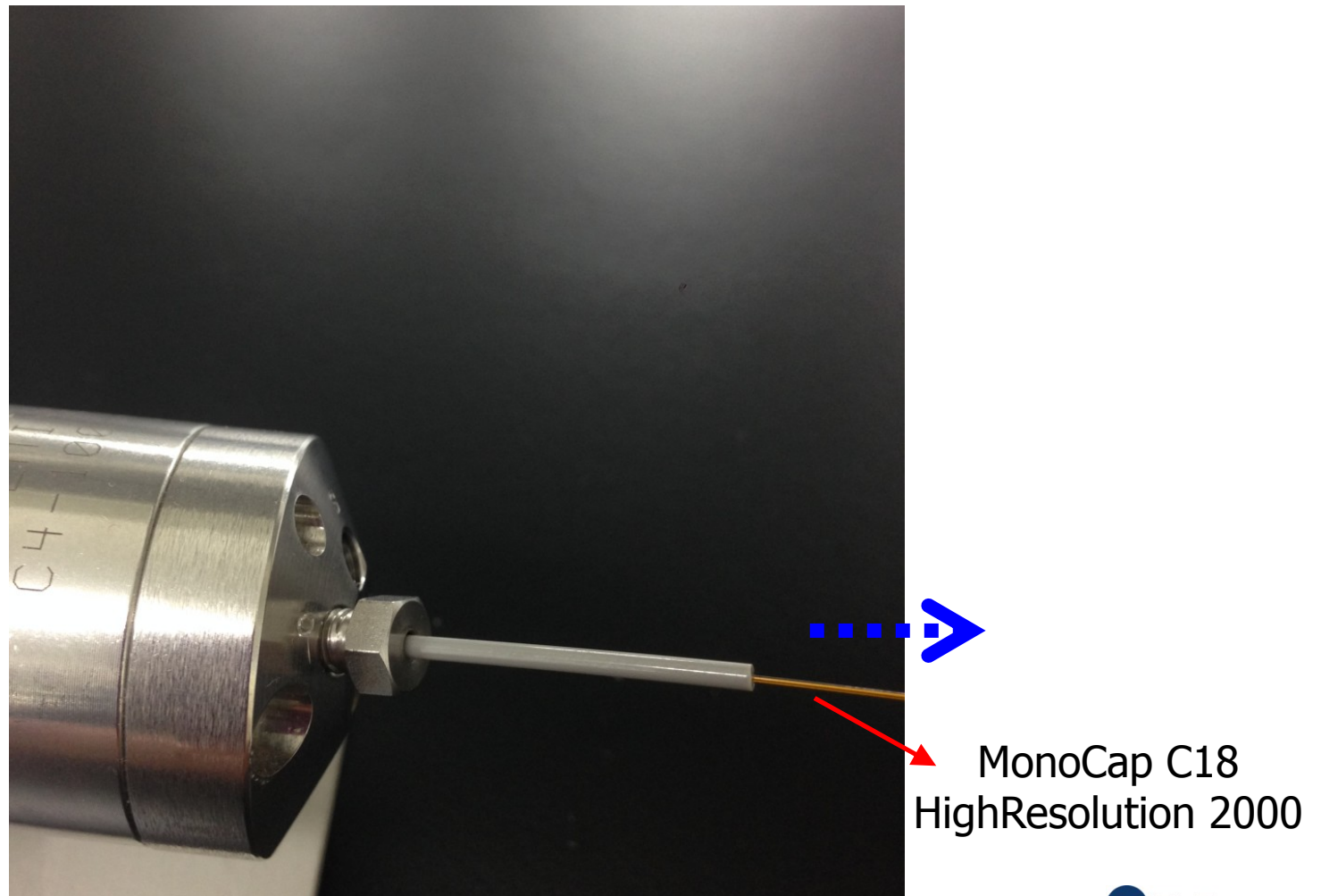
Installing MonoCap to the appropriate End-fittings

5. Insert the MonoCap C18 HighResolution 2000 column into the sleeve. Then push the sleeve all the way into the port for a zero dead volume connection that the assembly seats firmly. Finally, keep pushing the MonoCap C18 column into the port direction and tighten the nut by two or three turns.



Installing MonoCap to the appropriate End-fittings

6. Gently pull the MonoCap C18 column to the direction shown below in blue. Make sure the column is not loose and it is firmly installed.



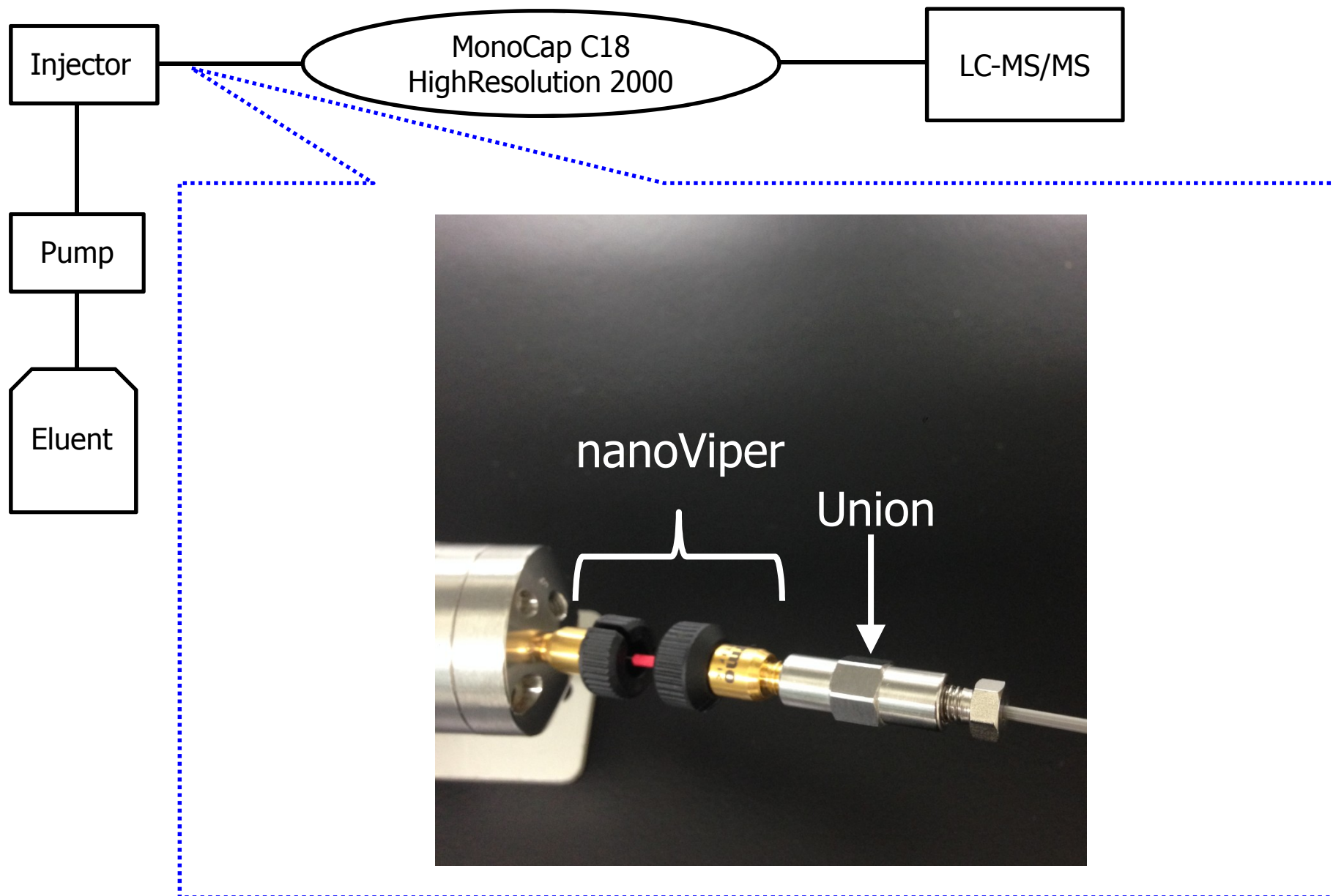
Column Connection

Purchase the following union when using a tubing that generates any indirect connection to the column.

Description	Model	Remarks	Cat.No.
Zero Dead Volume Union	U-435	For 1/16" SUS Tubing	6010-72352

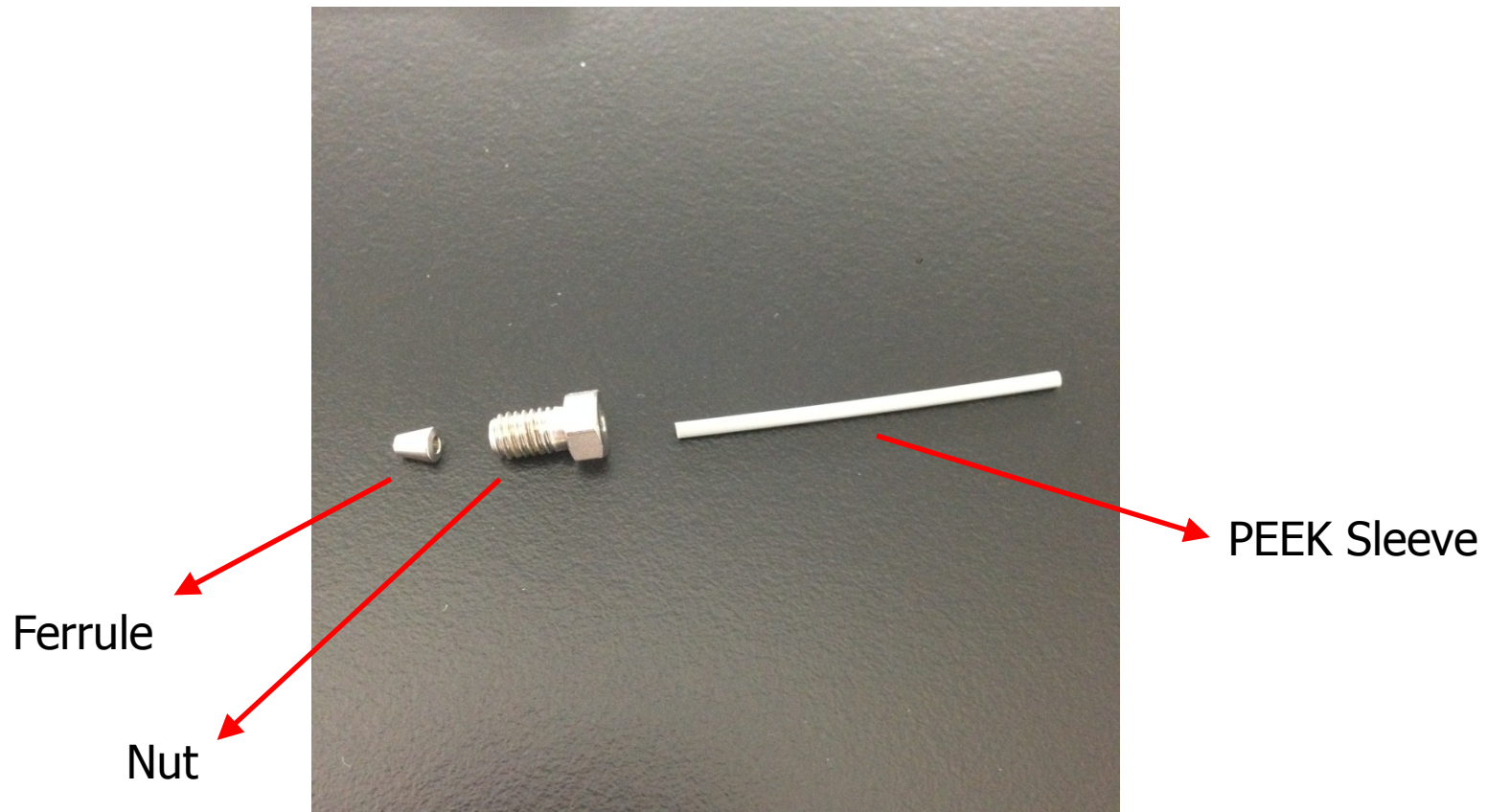


Example of Column Connection using nanoViper

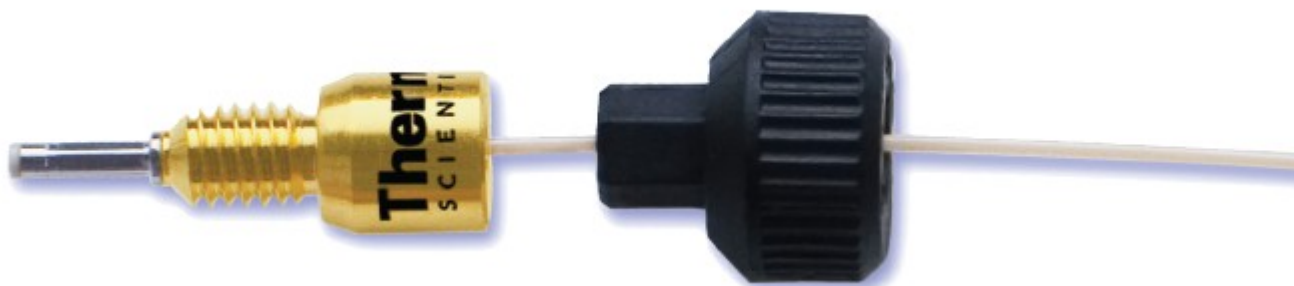


Installing MonoCap to nanoViper

1. Prepare 1/16" end-fittings and sleeve included in the MonoCap connection kit (Cat# 5020-10017).



Installing MonoCap to nanoViper

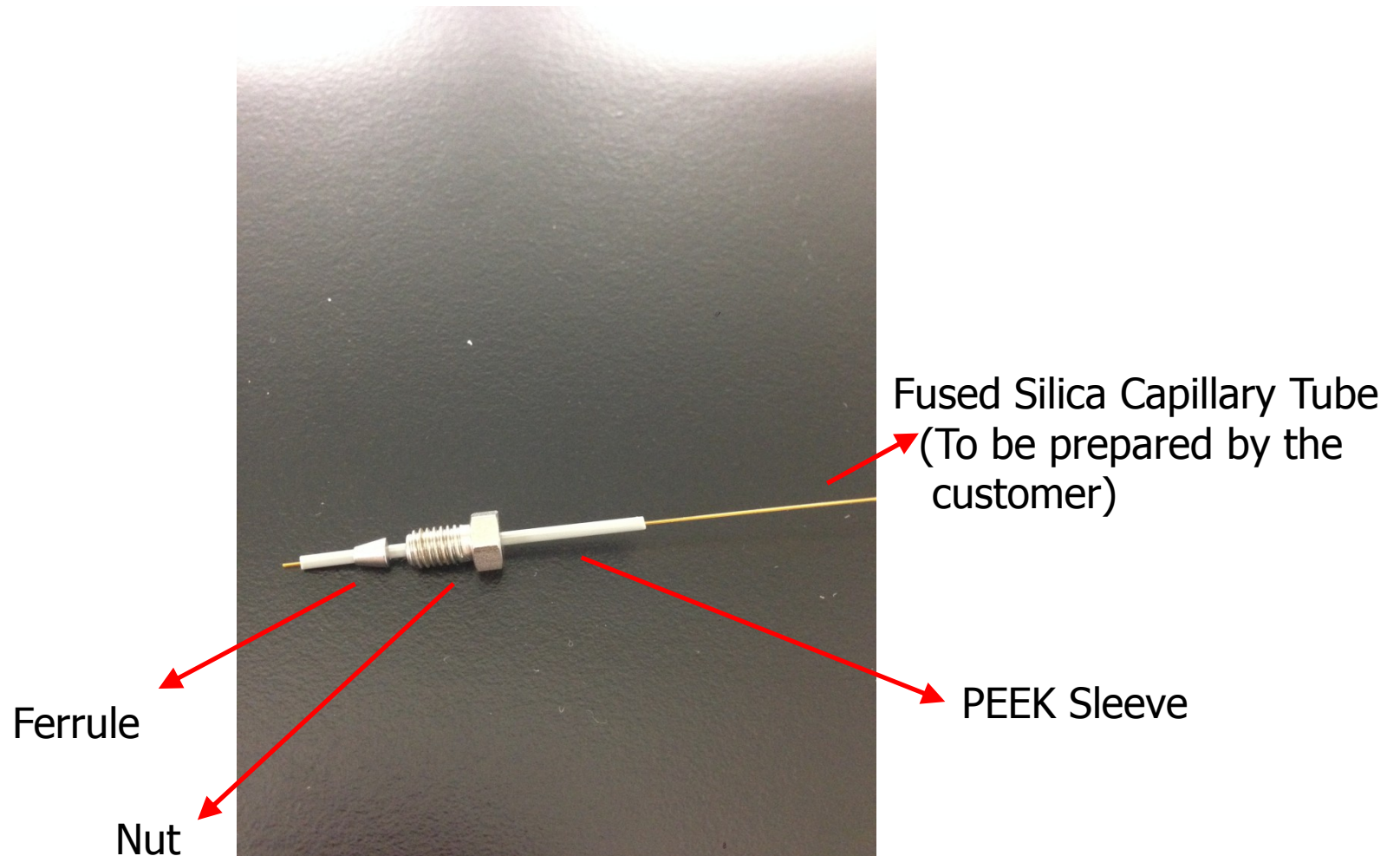


SPECIFICATIONS

Connection principle	Fingertight
Outer diameter	0.79 mm (1/32")
Maximum pressure	1,000 bar (14,500 psi)
Inner diameter	Various from 20 μ m to 150 μ m
Tubing type	PEEK shielded fused silica or integrated with nano LC columns
Temperature compability	80 °C
Available lengths	Various from 7–95 cm
Wetted materials	PEEK, Fused silica

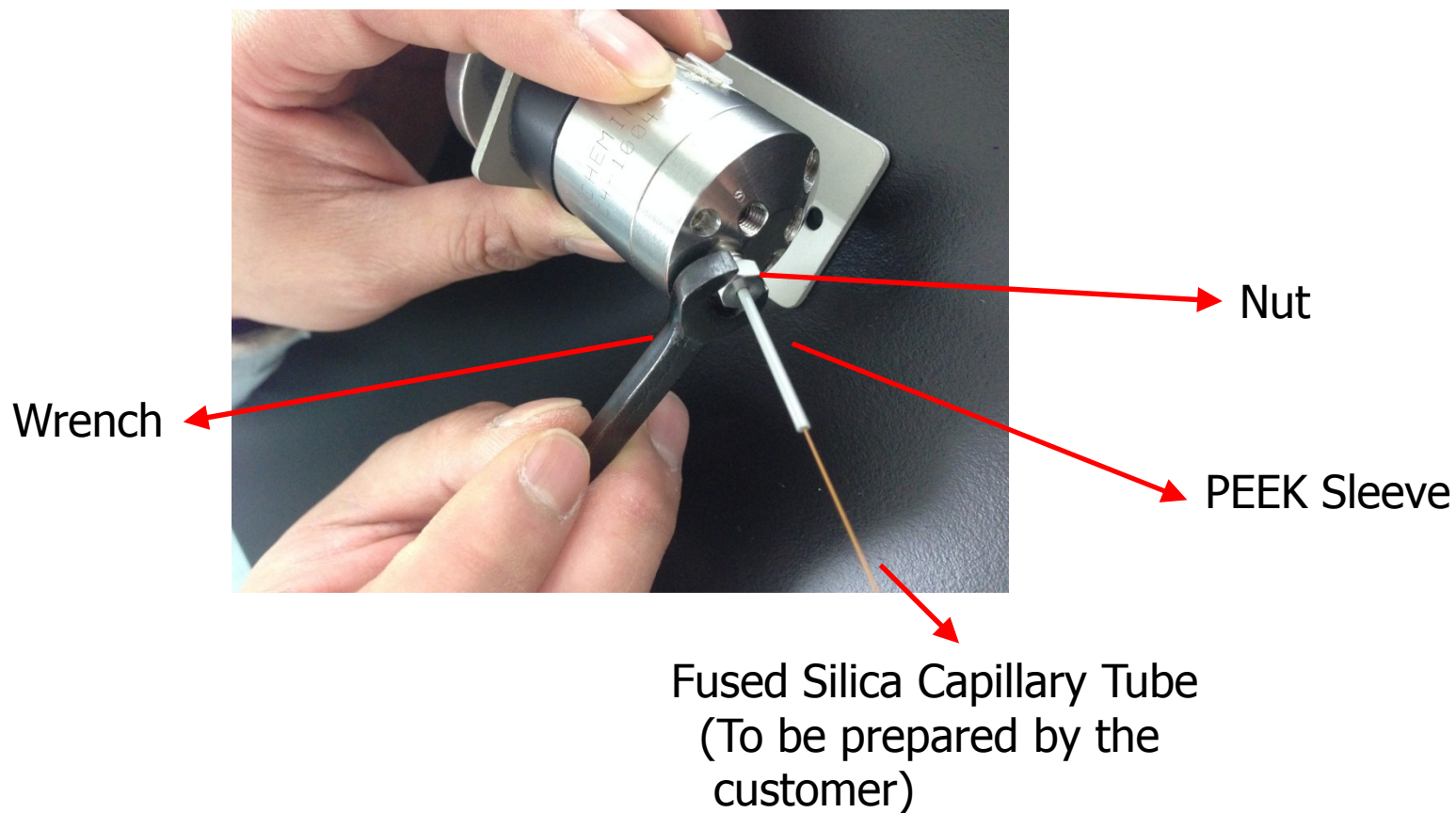
Installing MonoCap to nanoViper

2. Insert the sleeve into a nut and ferrule. Then insert a fused silica capillary tube into the sleeve.



Installing MonoCap to nanoViper

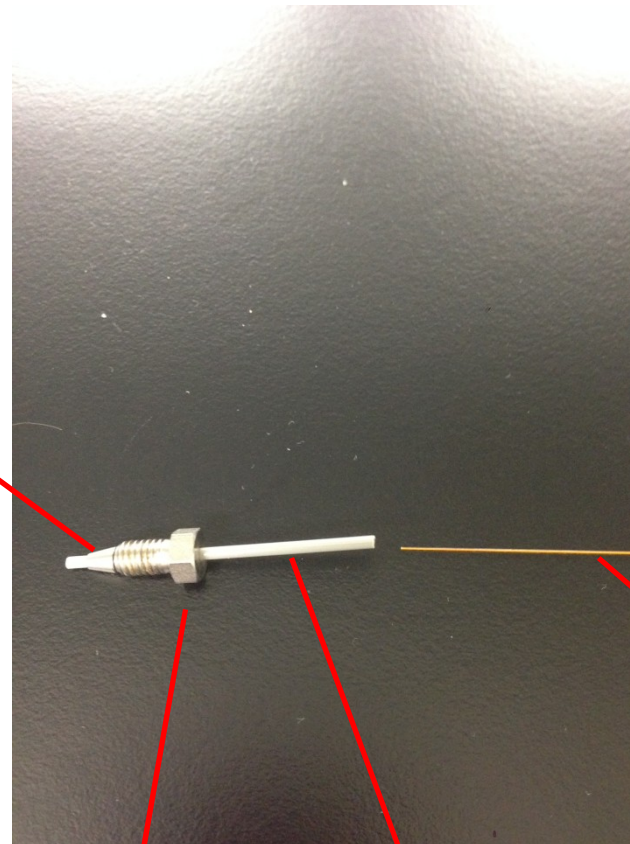
3. Insert the pre-assembled fitting into the injection port. Then tighten the nut by two or three turns using a wrench to make certain that the ferrule grabs the sleeve.



Installing MonoCap to nanoViper

4. Now the ferrule is fixed to the sleeve. Remove the fused silica capillary tube from the sleeve.

The ferrule is now fixed
to the sleeve



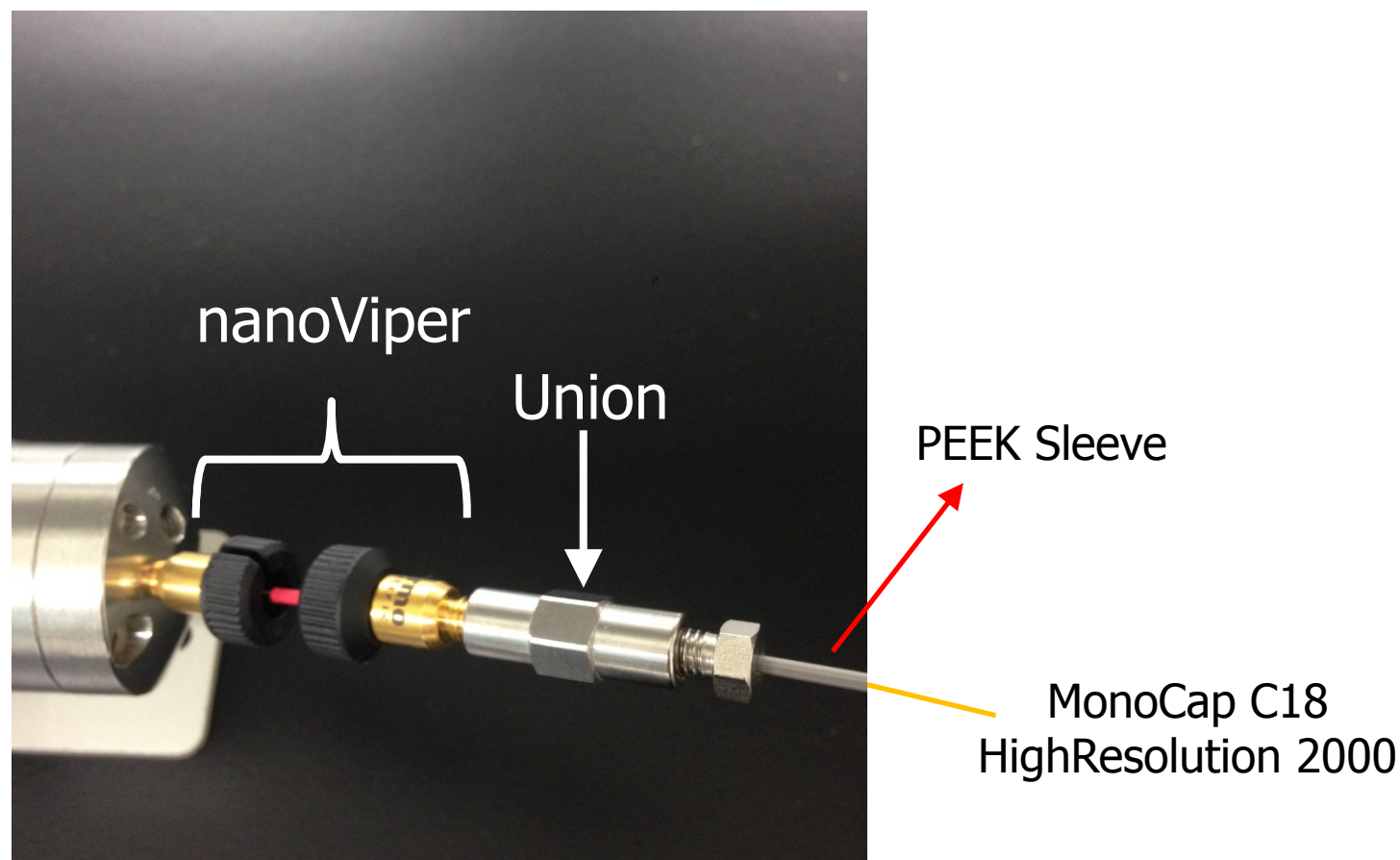
Fused Silica Capillary Tube
(To be prepared by the
customer)

Nut

PEEK Sleeve

Installing MonoCap to nanoViper

5. Connect the MonoCap C18 HighResolution 2000 column into union. Push the sleeve all the way into the union for a zero dead volume connection that the assembly seats firmly. Keep pushing the MonoCap C18 column into the union and tighten the nut by two or three turns. Gently pull the MonoCap C18 to confirm if the column is not loose and it is firmly installed. Finally, fingertight the nanoViper to the injection port.



Example of Column Connection

