



Electrochemistry with temperature control

- Systems
- Cells
- Software
- Accessories

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2018



Microcell HC - Basic Package

Item No. + Product Name

Description

Parts included + Selected Applications

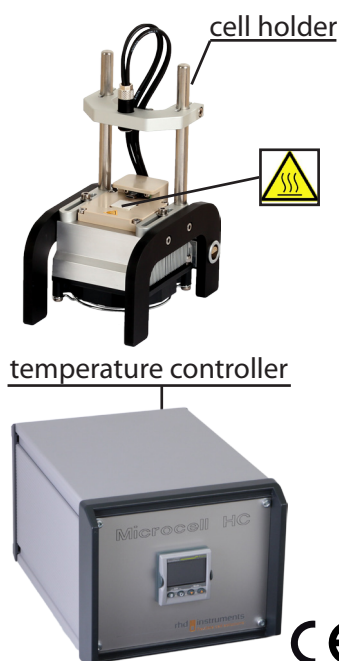
101 „Microcell HC Basic Package closed“

Basic setup, compatible with all closed measuring cells

Parts included:

- 1 Cell holder Microcell HC
- 1 Eurotherm temperature controller 3216
- 1 heat conducting compound
- 1 serial connection kit (item no. 441)
- 1 adapter box BNC - banana (item no. 442)
- 2 manuals
- all required connection cables + tools

No measuring cell included



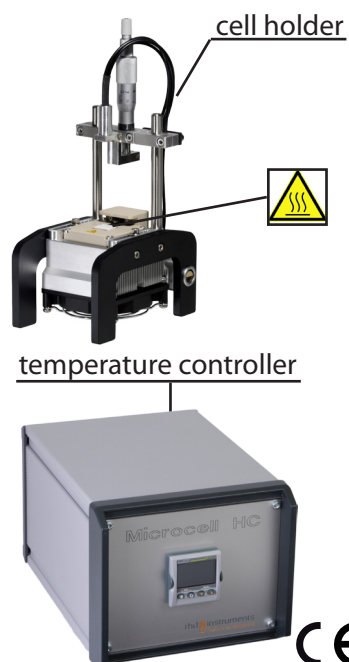
102 „Microcell HC Basic Package open“

Basic setup, compatible with all open measuring cells

Parts included:

- 1 Cell holder Microcell HC
- 1 positioning unit with micrometer screw (item no. 572)
- 1 Eurotherm temperature controller 3216
- 1 heat conducting compound
- 1 serial connection kit (item no. 441)
- 1 adapter box BNC - banana (item no. 442)
- 2 manuals
- all required connection cables + tools

No measuring cell included



Microcell HC - Measuring Cells



Item No.	+ Product Name Description Parts included + Selected Applications
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201 **„TSC 70 open“**

Measuring cell - Type “open”

for liquid samples

Specifications:

- For liquid samples
- $V_{\min} = 70 \mu\text{L}$
- Electrode diameter (Pt wire): 0.25 mm each
- T -range (operation): -40°C to $+100^\circ\text{C}$, depending on sample's mass and humidity conditions
- T -range (storage): $+10^\circ\text{C}$ to 30°C

Main parts included:

- 1 Cell unit with Pt sample container
- 1 Electrode plug with 4 glass-sealed Pt wires (item no. 511)

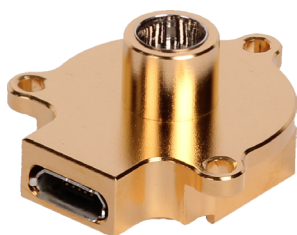
Selected applications:

- Determination of **dc-ion conductivity** of ionic liquids and other non-volatile “liquid” samples like polymerized ionic liquids
- Determination of the **electrochemical window** of ionic liquids (**only** with internal Pt pseudo-reference electrode of electrode plug)

electrode plug



sample container



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Microcell HC - Measuring Cells

Item No. + Product Name
Description
Parts included + Selected Applications

202 „TSC 1600 open“

Measuring cell - Type "open"

Specifications:

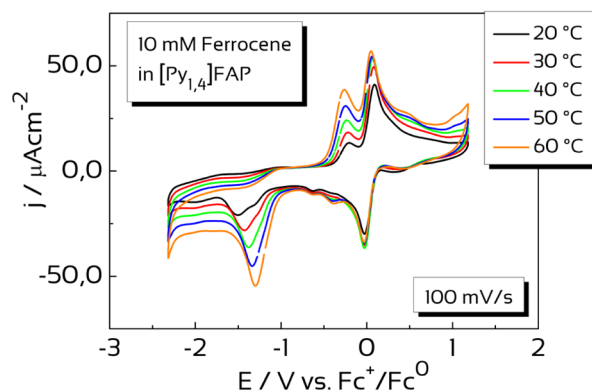
- For liquid samples
- $V_{\min} = 1.0$ mL
- Electrode diameter (Pt wire): 0.25 mm each
- T -range (operation): -40 °C to $+100$ °C, depending on sample's mass and humidity conditions
- T -range (storage): $+10$ °C to 30 °C

Main parts included:

- 1 Cell unit with Pt sample container
- 1 Electrode plug with 4 glass-sealed Pt wires (item no. 511)

Selected applications:

- Determination of **dc-ion conductivity** of ionic liquids and other non-volatile "liquid" samples like polymerized ionic liquids
- Determination of the **electrochemical window** of ionic liquids (**only** internal Pt pseudo reference electrode of electrode plug)



electrode plug



sample container



Measuring cells

Microcell HC - Measuring Cells

Item No. + Product Name
Description
Parts included + Selected Applications

203 „TSC Sw open“

Measuring cell - Type "open"

Specifications/Requirements:

- Max. \varnothing of disc-shaped samples (solid): 12 mm
- Samples are ideally disc-like in shape and dimensionally stable when being set under pressure
- T-range (operation): -40 °C to +100 °C, depending on sample's mass and humidity conditions
- T-range (storage): +10 °C to 30 °C

Main parts included:

- 1 Electrode plug with one-sided polished stainless steel disc (diameter: 12 mm)
- 1 Cell unit containing one exchangeable one-sided polished stainless steel disc electrode for sample mounting
- 1 Cover made of PEEK to simplify positioning of the upper electrode

Selected applications:

- Determination of **dc-ion conductivity** of gels and glasses
- **Dielectric spectroscopy** of solid samples

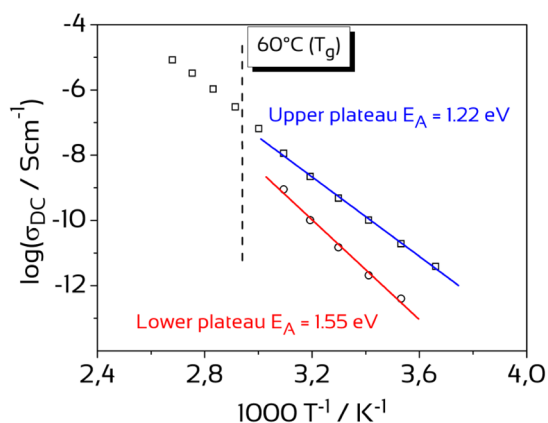
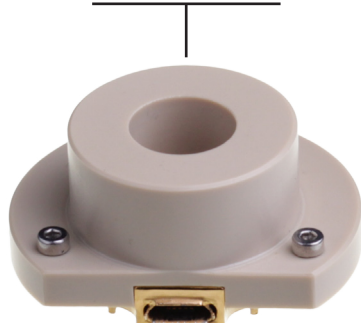
electrode plug



disc electrode with spherical joint



sample mount equipped with cover and disc electrode



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Microcell HC - Measuring Cells

Item + Product Name
No.

Description

Parts included + Selected Applications

211 „TSC 70 closed“

Measuring cell - Type "closed"

Specifications:

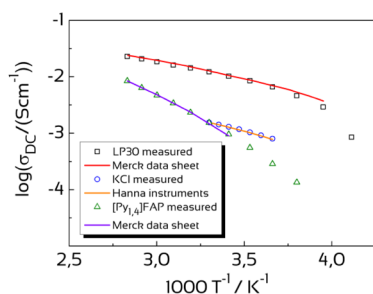
- For liquid samples
- $V_{\min} = 70 \mu\text{L}$
- Electrode diameter (plug): 0.25 mm each
- T -range (operation): $-40 \text{ }^\circ\text{C}$ to $+100 \text{ }^\circ\text{C}$, depending on sample's mass and humidity conditions
- T -range (storage): $+10 \text{ }^\circ\text{C}$ to $30 \text{ }^\circ\text{C}$

Main parts included:

- 1 Cell unit with Pt sample container
- 1 Cap containing electrode plug with 4 glass-sealed Pt wires and two plugs which seal two inlets for connecting fittings (item no. 501)
- 1 Cover made of PEEK
- 2 o-rings 15x2 mm made of EPDM by default; other materials are available (item no. 401)

Selected applications:

- Determination of **dc-ion conductivity** of liquid volatile and/or moisture and air-sensitive samples like carbonate-based battery electrolytes or dye solutions in organic solvents like acetonitrile
- Determination of the **electrochemical window** of liquid volatile and/or moisture and air-sensitive samples - several capillary-based reference electrodes as well as mountings for Li pseudo-reference electrodes are available (item no. 5241, 525, 5261, 5271).



cap with
electrode plug



sample container
with PEEK cover



Measuring cells

Microcell HC - Measuring Cells



Item No.	+ Product Name	Description	Parts included + Selected Applications
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cap with electrode plug



sample container with PEEK cover



212 „TSC 1600 closed“

Measuring cell - Type "closed"

Specifications:

- For liquid samples
- $V_{\min} = 1.0 \text{ mL}$
- Electrode diameter (plug): 0.25 mm each
- T -range (operation): $-40 \text{ }^{\circ}\text{C}$ to $+100 \text{ }^{\circ}\text{C}$, depending on sample's mass and humidity conditions
- T -range (storage): $+10 \text{ }^{\circ}\text{C}$ to $30 \text{ }^{\circ}\text{C}$

Main parts included:

- 1 Cell unit with Pt sample container
- 1 Cap containing electrode plug with 4 glass-sealed Pt wires and two plugs which seal two inlets for connecting fittings (item no. 501)
- 1 Cover made of PEEK
- 2 o-rings 15x2 mm made of EPDM by default; other materials available (item no. 401)

Selected applications:

- Determination of **dc-ion conductivity** of liquid volatile and/or moisture and air-sensitive samples like carbonate-based battery electrolytes.
- Determination of **HOMO-LUMO gaps** of organic dyes by measuring cyclic voltammograms of dye solutions in organic solvents like acetonitrile.
- Determination of the **electrochemical window** of liquid volatile and/or moisture and air-sensitive samples - several capillary-based reference electrodes as well as mountings for Li pseudo-reference electrodes are available (item no. 5241, 525, 5261, 5271).

Microcell HC - Measuring Cells

Item No. + Product Name
 Description
 Parts included + Selected Applications

213 „TSC Sw closed“

Measuring cell - Type "closed"

Specifications:

- Max. diameter of disc-shaped samples (solid): 12 mm
- Samples are ideally disc-like in shape and dimensionally stable when being set under pressure
- T-range (operation): -40 °C to +100 °C, depending on sample's mass and humidity conditions
- T-range (storage): +10 °C to 30 °C

Main parts included:

- 1 Cell unit containing one exchangeable one-sided polished stainless steel disc electrode for sample mounting
- 1 Cover made of PEEK
- 1 ball joint-fixed polished stainless steel disc electrode for contacting sample
- 1 Gold-plated spring for pressure adjustment
- 1 Cap with spring contact
- 2 o-rings 15x2 mm made of EPDM by default; other materials are available (item no. 401)

Selected applications:

- Determination of **dc-ion conductivity** of gels and glasses
- **Dielectric spectroscopy** of solid samples

cap with spring contact



measuring cell without cap



platform for sample mounting



Microcell HC - Measuring Cells

Item No. + Product Name
Description
Parts included + Selected Applications

cap with spring contact



gold-plated spring and screw



upper electrode



screw plug and fittings



lower electrode for flat samples



ready to go

214_s/e „TSC battery standard/expanded*“

Measuring cell - Type "closed"

Specifications:

- Max. diameter of disc-shaped solid sample: 12 mm
- Samples are ideally disc-like in shape and dimensionally stable when being set under pressure
- *T*-range (operation): -40 °C to +100 °C, depending on sample's mass and humidity conditions
- *T*-range (storage): +10 °C to 30 °C

Main parts included:

- 1 nickel-plated cell unit to fix lower electrode
- 2 stainless steel electrodes (pressed in PEEK) for flat samples
- *2 electrodes (pressed in PEEK) for usage of elemental lithium, electrode material: stainless steel*
- 1 Cover made of PEEK
- 1 Gold-plated spring and screw
- 1 Cap with spring contact
- 3 screw plugs: Li reference plug, capillary plug and blank plug
- O-rings: 4 (8) x item no. 402 EPDM, 2 x item no. 405 EPDM, 3 x item no. 406 FFKM)
- 100 Ohm test resistor (item no. 591)

Selected applications:

- Determination of **dc-ion conductivity** of solid ion conductors, glasses, and gels
- **Dielectric spectroscopy** of solid samples
- Investigations of batteries (**half and full cells**) and supercaps in two or three-electrode configuration
- Determination of **MacMullin number** (separators)
- Studies of hybrid materials (solid + liquid)

*Parts written in italic are only included in the expanded version

Microcell HC - Measuring Cells

Item No. + Product Name
Description
Parts included + Selected Applications

215 „TSC surface“

Measuring cell - Type "closed"

Specifications:

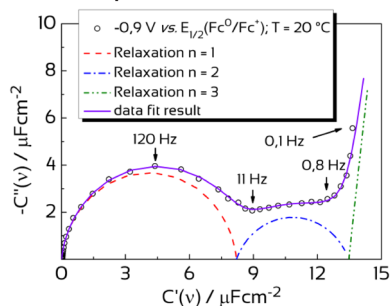
- Rectangular solid samples: minimum side length: 10 mm, maximum side length: 15 mm
- Round solid samples: minimum diameter: 12 mm, maximum diameter: 20 mm
- Max. sample thickness: 2 mm
- Samples should be dimensionally stable when being set under pressure
- T-range (operation): -40 °C to +100 °C, depending on sample's mass and humidity conditions
- T-range (storage): +10 °C to 30 °C

Main parts included:

- 1 gold-plated platform for sample mounting
- 1 Cover made of PEEK containing 4 gold-plated contact springs
- 1 Cap with exchangeable glassy carbon electrode (diameter: 6 mm; item no. 510, short)
- 3 plugs: Li reference plug, capillary plug and blank plug
- O-rings: 1 x item no. 401 EPDM, 2 x item no. 404 FFKM, 3 x item no. 406 FFKM)

Selected applications:

- **Corrosion studies**
- Investigation of the electrochemistry of solid/liquid **interfaces**



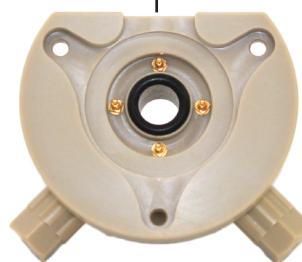
cap with exchangeable glassy carbon electrode



screw plug and fittings



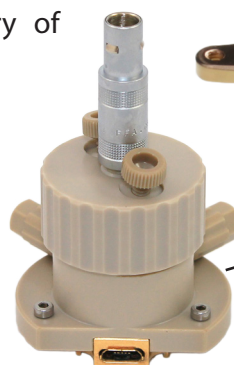
PEEK cover with four contact pins



platform for sample mounting



ready to go



Measuring cells

Microcell HC - Measuring Cells

Item No. + Product Name
Description
Parts included + Selected Applications

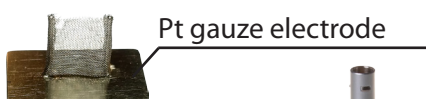
cap with exchangeable electrode 216



light-proof PEEK cover with optical windows

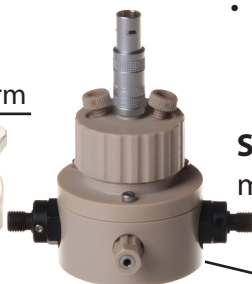


bottom view of PEEK housing



Pt gauze electrode

gold plated platform



„TSC spectro“

Measuring cell - Type "closed"

Specifications:

- For liquid samples
- $V_{\min} = 0.5$ mL (in comb. with SP 5102), $V_{\max} = 2.0$ mL
- Working electrode: Pt gauze electrode by default
- Counter electrode: glassy carbon (cap with exchangeable electrode)
- 2 windows equipped with collimator lenses enable UV/Vis measurements in transmission mode:
 - Optical path length adjustable: ~1.4 mm to 0.12 mm (thickness of Pt mesh)
 - Wavelengths: 200-2500 nm
- T-range (operation): -20 °C to +80 °C, depending on sample's mass and humidity conditions
- T-range (storage): +10 °C to 30 °C

Main parts included:

- 1 gold-plated platform for working electrode mounting
- 1 Pt gauze electrode
- 1 Cap with exchangeable glassy carbon electrode (item no. 512, long); on demand: item no. 510 (short)
- 1 Light-proof PEEK cover
- 2 screw plugs: capillary plug and blank plug
- O-rings: 2 x item no. 401 FFKM, 1 x item no. 402 FFKM, 1 x item no. 404 FFKM, 1 x item no. 406 FFKM, 2 x 407 FFKM

Spectroelectrochemical studies of inorganic metal complexes or organic dyes in solution (CV + UV/Vis)
ready to go

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Microcell HC - Software

Item No. + Product Name
Description
Parts included + Selected Applications

301 „HC Control“

Software for communicating with temperature controller, required e.g. for devices from Solartron or Princeton Research; can also be used as stand-alone software

Included:

One license for one PC (unlimited no. of users at this PC)



31x „RelaxIS“

Stand alone fitting software with training option (simulation). Single license with unlimited validity period. The software can be installed on an unlimited number of computers but can only be used by one computer at a time.

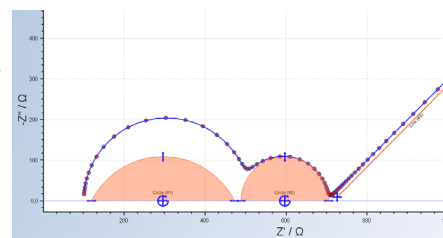
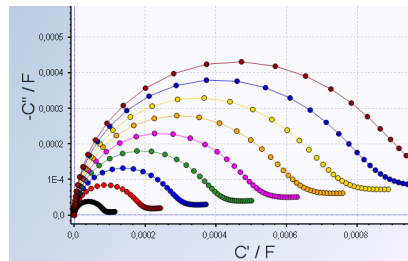
Available either as **buying license** or as **rental license**.

Included:

- 1 licence for 1 simultaneous PC (unlimited no. of users)
- Service and Support
- 1 activation dongle (USB) overall

System Requirements

- Microsoft Windows Vista (SP2) or above
- .NET Framework 4.5 or above



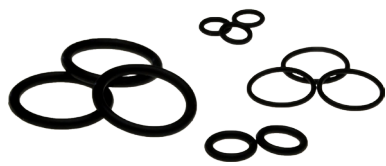
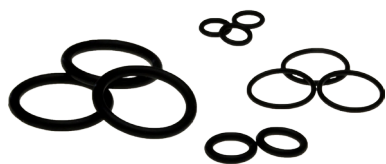
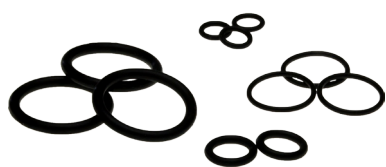
Software



Microcell HC - Accessories

Item No. + Product Name
Description
Parts included + Selected Applications

401x - 407x **O-rings**



Prior to use please check the compatibility of the respective o-ring material with all your chemicals! Incompatibility may not only result in swelling of the o-rings, but also in serious damage to your sample and even the measuring cell.

Please check the table on page 23 for the o-ring amounts and the materials included by default with the delivery for the respective measuring cell.

Amount: 6 pcs. in case of FFKM, 20 pcs. in case of FKM and EPDM

Size	Item No.		
	EPDM	FKM	FFKM
4 x 1 mm	406E	406F	406FF
5 x 1 mm			407FF
6 x 1.5 mm	404E	404F	404FF
7 x 1.5 mm	403E	403F	-
10 x 1 mm	402E	-	402FF
15 x 2 mm	401E	401F	401FF
17 x 2 mm	405E	-	-



411 **„Heat sink compound“**

Amount: 1 ml

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Microcell HC - Accessories

Item + Product Name
No. Description

Parts included + Selected Applications

412 „Cleaning and polishing set“ - Option: „-110 V“

Parts included:

- 1 x 10 g diamond paste (0.25 µm particle size)
- 560 cotton pads
- 800 polishing sticks
- Handheld electrical multipurpose tool
- 5 polishing pads
- 1 voltage converter 110 V to 230 V (only 110 V option, e.g. for US customers)



413 „Diamond paste 0.25 µm“

Amount: 10 g



42x „Conductivity standard solution“

421: $\sigma_{DC} = 1.413 \text{ mS/cm @ } 25 \text{ }^\circ\text{C}$

422: $\sigma_{DC} = 12.880 \text{ mS/cm @ } 25 \text{ }^\circ\text{C}$

Amount: 25 pcs. à 20 mL




Accessories






13

Microcell HC - Accessories

Item No.	+ Product Name Description	Parts included + Selected Applications
431	„Cooling Box“	<p>Cooling box needed for low temperature measurements or below dew point</p> <p>Parts included:</p> <ul style="list-style-type: none"> • Temperature controller equipped with display • Cable feed-through containing one connecting cable Microcell HC setup / temperature controller and 4 x BNC connecting cables • 1 platform suitable for Microcell HC cell holders • IMPORTANT: rated for 230 V; item no. 444 (voltage converter required for e.g. US customers)
		<p>Microcell HC setup not included</p>
441	„Serial connection kit“	<p>Required if no native serial connection is available for communicating with the temperature controller (incl. in item no. 101/102)</p> <p>Parts included: e.g. Moxa® USB-to-serial adapter + driver CD</p>
	442	„Adapter Box BNC - Banana plug“
	<p>An elegant way of connecting the measuring cells and the Microcell HC setup with the measuring device and lowers the influence of interferences (incl. in item no. 101/102)</p> <p>Parts included: 3 x BNC cable of 30 cm length</p>	

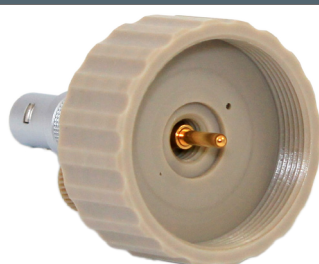
Microcell HC - Accessories

Item No.	+ Product Name	Description	Parts included + Selected Applications
501	„Cap with 4 glass-sealed Pt electrodes“	Cap containing 4 separate glass-sealed Pt-electrodes ($\varnothing = 0.25$ mm each); surface mirror-like polished	
	Suitable for:	Item no. 211, 212, (215)	
511	„Electrode plug with 4 glass-sealed Pt electrodes“	Electrode plug for usage with open measuring cell; 4 separate glass-sealed Pt electrodes ($\varnothing = 0.25$ mm each); surface mirror-like polished	
	Suitable for:	Item no. 201, 202	
502	„Cap with exchangeable electrode“		
-	Spare Parts (SP)		
510		Cap containing 1 exchangeable electrode pressed in PEEK made of various materials with diverging diameters and lengths as stated in the table on page 16; electrode surface mirror-like polished	
	Parts included:	Tool for electrode exchange (only for caps with 3 mm electrodes) + 1 x item no. 404 FFKM	
		In case of spare parts , only the part specified in the table on page 16 is included with delivery. If the spare part is an electrode, the scope of delivery also includes 1 x item no. 404 FFKM.	

exemplary image

Microcell HC - Accessories

Item No. + Product Name
Description
Parts included + Selected Applications



cap with contact pin
w/o electrode

502 - 510

„Cap with exchangeable electrode“

Electrode tips (ET)



exemplary image:
stainless steel elec-
trode, short, Ø = 6
mm



exemplary image:
glassy carbon elec-
trode, Ø = 3 mm

Item No.	Descr.	Material	Diameter [mm]	Type	Suitable for measuring cell
840502	Cap*	glassy carbon	3		211*, 212, (215)
8405021	ET for 502	glassy carbon	3		211*, 212, (215)
8405022**	SP for 502	Cap with contact pin w/o electrode			211*, 212, (215)
840503	Cap	stainless steel	6	short	215, 216
8405031	ET for 503	stainless steel	6	short	215, 216
840504	Cap*	stainless steel	3		211*, 212, (215)
8405041	ET for 504	stainless steel	3		211*, 212, (215)
840505	Cap	platinum	6	short	215, 216
8405051	ET for 505	platinum	6	short	215, 216
840506	Cap*	platinum	3		211*, 212, (215)
8405061	ET for 506	platinum	3		211*, 212, (215)
840507	Cap	copper	6	short	215, 216
8405071	ET for 507	copper	6	short	215, 216
840508	Cap*	copper	3		211*, 212, (215)
8405081	ET for 508	copper	3		211*, 212, (215)
840510	Cap	glassy carbon	6	short	215, 216
8405101	ET for 510	glassy carbon	6	short	215, 216
8405102	ET for 510	glassy carbon	6	long	216

* only 2-electrode measurements are possible with item no. 211

** Spare part (SP): can be used in combination with all electrode tips

2018

Microcell HC - Accessories

Item + Product Name
No. Description

Parts included + Selected Applications

Micro reference electrodes (only available at rhd instruments directly)

Parts included: Storage container with regeneration solution and connecting cable

Suitable for: Item no. 211, 212, 215, 216

521 „Micro reference electrode classical“

Micro reference electrode based on the system Ag/AgCl//KCl 3 M in H₂O

522 „Micro reference electrode ionic liquid“

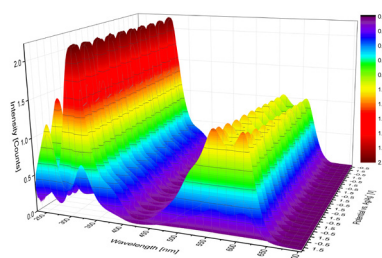
Micro reference electrode based on the system Ag/AgCl//AgOTf 10 mM in [EMIm]TFSI

523 „Micro reference electrode organic carbonate“

Micro reference electrode based on the system Ag/AgCl//AgOTf 10 mM in EC:DMC = 1:1

Selected applications:

- **Corrosion** studies
- **Spectroelectrochemical** studies on inorganic metal complexes or organic dyes in solution (CV + UV/Vis)



Microcell HC - Accessories

Item No. + Product Name

Description

Parts included + Selected Applications

524x - 526x **Micro reference electrodes pseudo**



Micro reference electrode based on metal wire (Ag or Pt); in case of type Ag/AgCl Ag wire covered with AgCl

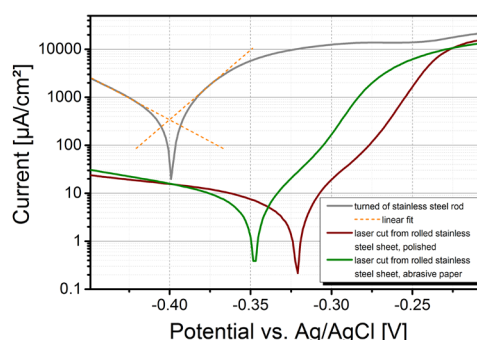
Parts included: Storage container and connecting cable

Type	Item No. for the respective measuring cell			
	TSC 1600 closed TSC 70 closed	TSC battery	TSC surface	TSC spectro
Ag	5241	5242	5243	5244
Ag/AgCl	5271	5272	5273	5274
Pt	5261	5262	5263	5264

Selected applications:

Corrosion studies

Spectroelectrochemical studies on inorganic metal complexes or organic dyes in solution (CV + UV/Vis)



525 **„Mount for Li-reference electrode“**







Elementary Li can be attached to this mount to built a Li-reference electrode; **suitable for measuring cell 212 only.**

Amount:
5 pcs.

Parts included:
1 connecting cable and 2 fittings

Microcell HC - Accessories







Item No.	+ Product Name Description Parts included + Selected Applications	
531	„Stainless steel disc electrodes“*	
533	„Stainless steel disc electrodes gold plated“* One-sided mirror-like polished disc electrodes made of stainless steel ($\varnothing = 12$ mm) Amount: 6 pcs.	
532	„Nickel disc electrodes“*	
534	„Nickel disc electrodes gold plated“* One-sided mirror-like polished disc electrodes made of nickel ($\varnothing = 12$ mm) Amount: 6 pcs.	
535	„Stainless steel disc electrodes nickel plated“* One-sided mirror-like polished disc electrodes made of stainless steel ($\varnothing = 12$ mm) Amount: 6 pcs.	
541	„Spacer set“* Spacer set consisting of 5 x Mylar®-foil 5 x PEEK-foil outer- $\varnothing = 12$ mm, inner- $\varnothing = 8$ mm thickness of Mylar®- foil: 80 μ m thicknesses of PEEK foil: 25, 50, 100 and 2 x 200 μ m	

Microcell HC - Accessories

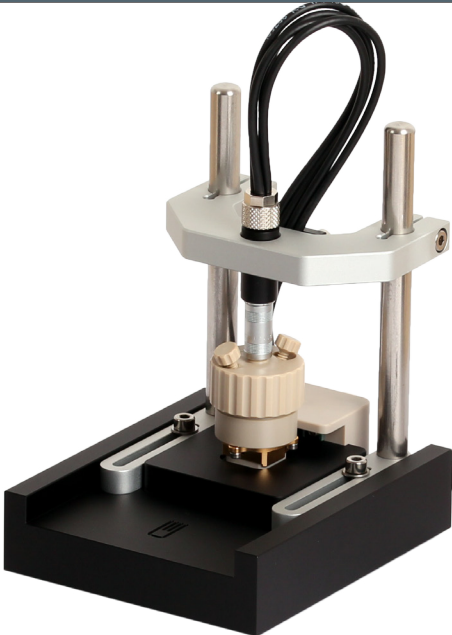

Item No.	+ Product Name	Description	Parts included + Selected Applications
551	„Capillary-based filling set“	Needed for filling additional liquid solution into measuring cell through fittings while cell is closed	Parts included: 1 gas-tight Hamilton-syringe
552	„Capillary-based gas-inlet set“	Needed for leading gas into measuring cell through fittings	
561	„Cable feed-through, with 40 mm DIN flange by default“	The flange size depends on the conditions with regard to the operator's glove box. The cable feed-through contains one connecting cable Microcell HC set-up / temperature controller and 4 x BNC connecting cables.	

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Microcell HC - Accessories

Item No.	+ Product Name	Description	Parts included + Selected Applications
571	„Faraday cage“	Faraday cage made of Al profile covered with acrylic glass; cable feed-through for 4 Microcell HC setups, gas inlet ($p_{\text{max, relative}} = 0.5 \text{ bar}$)	
572	„Faraday cage with dew point sensor“	Like 571 + dew point sensor with display	
581	„Modification set item no. 101 to 102“	Modification set needed if closed and open measuring cells should be used with the same Microcell HC setup	
	Parts included:	<ul style="list-style-type: none"> • Positioning unit with micrometer screw 	
583	„Modification set item no. 102 to 101“	Modification set needed if closed and open measuring cells should be used with the same Microcell HC setup	
	Parts included:	<ul style="list-style-type: none"> • Connecting cable for closable cells, positioning unit 	

Microcell HC - Accessories

Item No.	+ Product Name Description Parts included + Selected Applications
	<p>582 „Passive Cell Holder“</p> <p>Cell stand for measurements without the need for temperature control</p> <p>If an active temperature control is not necessary for the execution of your electrochemical experiments, it represents a cost-effective alternative to the Microcell HC Basic Package.</p> <p>Parts Included:</p> <ul style="list-style-type: none"> • 1 Passive cell holder • 1 adapter box BNC - banana (item no. 442) • 2 manuals • all required connection cables + tools <p>No measuring cell included</p>
	<p>591 „100 Ohm test resistor“</p> <p>100 Ohm test resistor suitable for measuring cells 203, 213, and 214</p>
	<p>599 „Transport case“</p> <p>High-quality transport case with sufficient space for 1 x item no. 101 and 2-3 measuring cells.</p>

Spare parts - o-rings

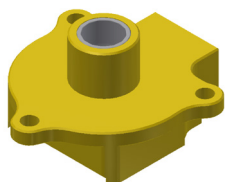
Measuring cell	O-rings			
	Size	Amount	Available materials	Default material
TSC 70 open	-			
TSC 1600 open	-			
TSC Sw open	15 x 2 mm	1	FKM, EPDM, FFKM	EPDM
TSC 70 closed	15 x 2 mm	2	FKM, EPDM, FFKM	EPDM
TSC 1600 closed	15 x 2 mm	2	FKM, EPDM, FFKM	EPDM
TSC Sw closed	17 x 2 mm	2	FKM, EPDM, FFKM	EPDM
TSC battery	4 x 1 mm	3	EPDM, FFKM	FFKM
	10 x 1 mm	4 - 8	EPDM, FFKM	EPDM
	17 x 2 mm	2	EPDM, FFKM	EPDM
TSC surface	4 x 1 mm	3	FKM, EPDM, FFKM	FFKM
	6 x 1.5 mm	2	FKM, EPDM, FFKM	FFKM
	15 x 2 mm	1	FKM, EPDM, FFKM	EPDM
TSC spectro	4 x 1 mm	1	FKM, EPDM, FFKM	FFKM
	5 x 1 mm	2	FKM, EPDM, FFKM	FFKM
	6 x 1.5 mm	1	FKM, EPDM, FFKM	FFKM
	10 x 1 mm	1	FKM, EPDM, FFKM	FFKM
	15 x 2 mm	2	FKM, EPDM, FFKM	FFKM



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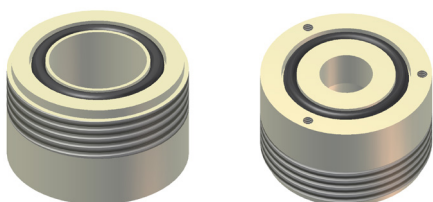
Spare parts - TSC 70 closed

Item No. + Product Name
Description



2111 „Thermo block with Pt crucible“

1 gold-plated thermo block for TSC 70 closed including Pt100 temperature sensor equipped with Pt crucible.



2112 „PEEK housing standard“

1 housing for TSC 70 closed; included: 2 x o-ring 15x2 mm EPDM (item no. 401E).

2113 „PEEK housing special“

1 housing for TSC 70 closed; short version allowing for low dead volume; included: 2 x o-ring 15x2 mm EPDM (item no. 401E).

Important: only compatible in combination with item no. 501 (“cap with 4 glass-sealed Pt electrodes”) + cap inlets cannot be used!



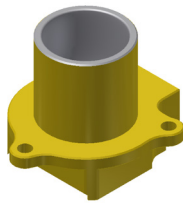
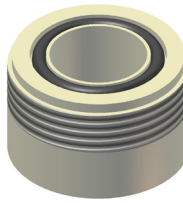

2114 „Tools, screws and o-rings“

9 x screw M2x5 DIN912 A2, 1 x hex key 1,5 mm, 6 x o-ring 15x2 mm EPDM (item no. 401E).



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Spare parts - TSC 1600 closed

Item No.	+ Product Name Description	
2121	<p>„Thermo block with Pt crucible“</p> <p>1 gold-plated thermo block for TSC 1600 closed equipped with Pt crucible including Pt100 temperature sensor.</p>	
2122	<p>„PEEK housing standard“</p> <p>1 housing for TSC 1600 closed; included: 2 x o-ring 15x2 mm EPDM (item no. 401E).</p>	
2123	<p>„PEEK housing special“</p> <p>1 housing for TSC 1600 closed; short version allowing for low dead volume; included: 2 x o-ring 15x2 mm EPDM (item no. 401E), 1 x o-ring 14x2 mm EPDM.</p> <p>Important: Cap inlets cannot be used!</p>	
2124	<p>„Tools, screws and o-rings“</p> <p>9 x screw M2x5 DIN912 A2, 1 x hex key 1,5 mm, 6 x o-ring 15x2 mm EPDM (item no. 401E).</p>	

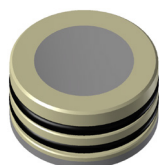
Spare parts



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Spare parts - TSC battery

Item + Product Name
No. Description



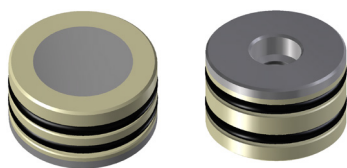
2141 „Upper electrode for plane samples“

1 one-sided polished stainless steel electrode (diameter 8 mm), pressed in PEEK (outer diameter 12 mm), with 2 lateral channels for o-rings; included: 4 x o-ring 10x1 mm EPDM (item no. 402E).



2142 „Upper electrode for contacting Li“

1 stainless steel electrode (diameter 8 mm), pressed in PEEK (outer diameter 12 mm), with 2 lateral channels for o-rings; with punching edge; included: 4 x o-ring 10x1 mm EPDM (item no. 402E).



2143 „Lower electrode for plane samples“

1 stainless steel electrode (diameter 8 mm), pressed in PEEK (outer diameter 12 mm), with 2 lateral channels for o-rings; with thread for thermo block at bottom side; included: 4 x o-ring 10x1 mm EPDM (item no. 402E).

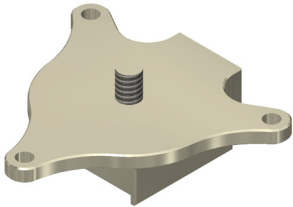

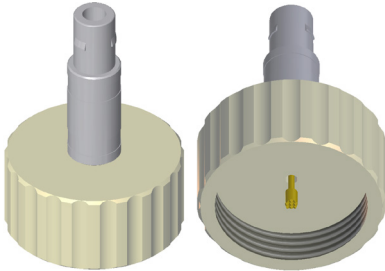



2144 „Lower electrode for contacting Li“

1 stainless steel electrode (diameter 8 mm), pressed in PEEK (outer diameter 12 mm), with 2 lateral channels for o-rings; with punching edge and thread for thermo block at bottom side; included: 4 x o-ring 10x1 mm EPDM (item no. 402E).



Spare parts - TSC battery

Item No.	+ Product Name Description	
2145	„Thermo block w/o lower electrode“ 1 nickel-plated thermo block for TSC battery including Pt100 temperature sensor; with thread to fix lower electrode.	
2146	„PEEK housing“ 1 housing for TSC battery w/o fittings and cap; included: 4 x o-ring 17x2 mm EPDM (item no. 405E).	
2147	„Cap with contact spring“ 1 cap with contact spring for usage with TSC battery.	
2148	„Screw for adjusting contact pressure“ 1 gold-plated screw for adjusting contact pressure in combination with item no. 21416 or 21417.	



Spare parts - TSC battery

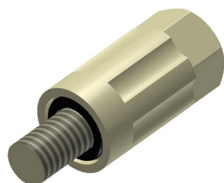
Item + Product Name
No. Description

2149 „Fitting set and plug”



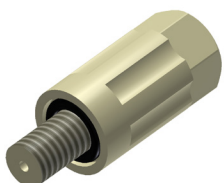
1 plug, 1 fitting for capillary-based reference electrodes and filling set, 1 fitting for usage with Li as reference electrode, all made of PEEK; included: 3 x o-ring 4x1 mm FFKM (item no. 406FF).

21410 „Plug”



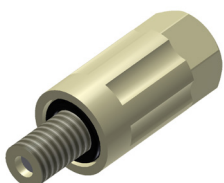
1 plug, made of PEEK; included: 1 x o-ring 4x1 mm FFKM (item no. 406FF).

21411 „Capillary fitting”



1 fitting for capillary-based reference electrodes and filling set, made of PEEK; included: 1 x o-ring 4x1 mm FFKM (item no. 406FF).




21412 „Li fitting”



1 fitting for usage of Li as reference electrode, made of PEEK; included: 1 x o-ring 4x1 mm FFKM (item no. 406FF).

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Spare parts - TSC battery

Item No.	+ Product Name Description	
21413	<p>„O-ring set“</p> <p>16 x o-ring 10x1 mm (EPDM) (item no. 402E), 2 x o-ring 17x2 mm (EPDM) (item no. 405E), 3 x o-ring 4x1 mm (FFKM) (item no. 406FF).</p>	
21414	<p>„Tools and screws“</p> <p>9 x screw M2x5 DIN912 A2, 1 x hex key 1,5 mm, 1 x hex key 8 mm, 1 x rod-like tool for removing and positioning the upper electrode, 1 x wrench for fixing lateral fittings and plug .</p>	
21415	<p>„2 mm connection cable“</p> <p>1 connection cable 2 mm banana plug to BNC female.</p>	
21416	<p>„Pressure regulating spring“</p> <p>1 gold-plated spring, standard version with spring constant = 2,3 N/mm.</p>	
21417	<p>„Pressure regulating spring - type strong“</p> <p>1 gold-plated spring, strong version with spring constant = 32,6 N/mm.</p>	

Spare parts

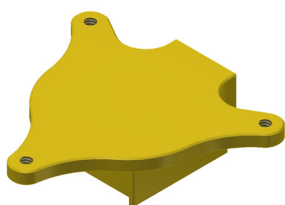


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Spare parts - TSC surface

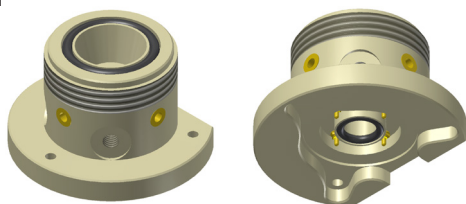
Item No.	+ Product Name Description
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2151 „Thermo block”



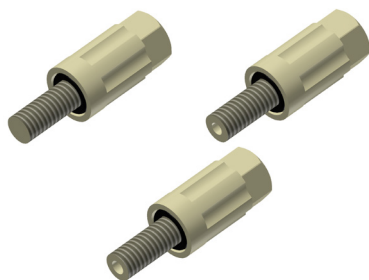
1 gold-plated thermo block with plane surface for TSC surface including Pt100 temperature sensor.

2152 „PEEK housing”



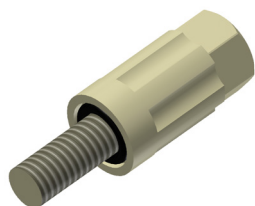
1 housing w/o fittings and cap; included: 2 x o-ring 15x2 mm EPDM (item no. 401E), 2 x o-ring 6x1.5 mm FFKM (item no. 404FF), 1 x 2 mm banana to 2 mm banana cable.

2153 „Fitting set and plug”



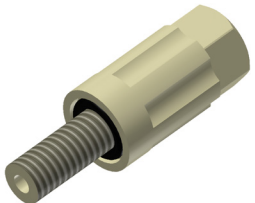
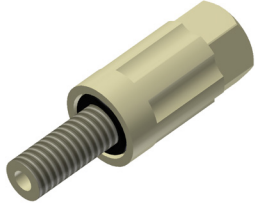


1 plug, 1 fitting for capillary-based reference electrodes and filling set, 1 fitting for usage with Li as reference electrode, all made of PEEK; included: 3 x o-ring 4x1 mm FFKM (item no. 406FF).

2154 „Plug”



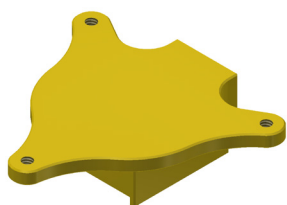
1 plug made of PEEK; included: 1 x o-ring 4x1 mm FFKM (item no. 406FF).

Spare parts - TSC surface

Item No.	+ Product Name Description	
2155	„capillary fitting“ 1 fitting for capillary-based reference electrodes and filling set, made of PEEK; included: 1 x o-ring 4x1 FFKM (item no. 406FF).	
2156	„Li fitting“ 1 fitting for usage of Li as reference electrode, made of PEEK; included: 1 x o-ring 4x1 FFKM (item no. 406FF).	
2157	„Tools and screws“ 9 x screw M2x5 DIN912 A2, 1 x hex key 1.5 mm, 1 x wrench for fixing lateral fittings and plug.	
		

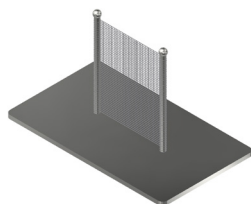
Spare parts - TSC spectro

Item + Product Name
No. Description



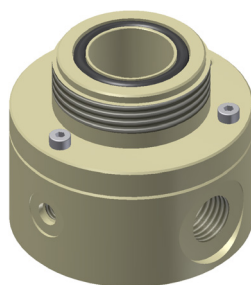
2161 „Thermo block“

1 gold-plated thermo block for TSC spectro with plane surface including Pt100 temperature sensor.



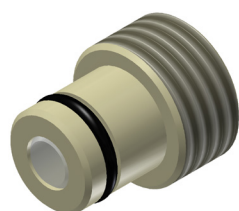
2162 „Pt gauze electrode“

1 Pt gauze electrode.



2163 „PEEK housing“

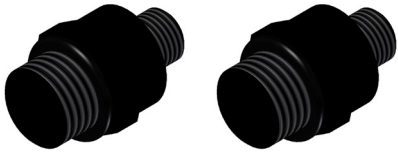
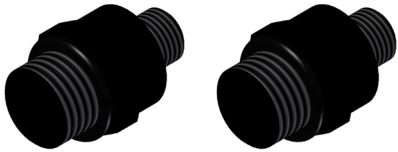
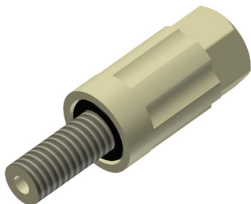
1 housing consisting of 2 separate parts, w/o optical windows and cap; included: 2 x o-ring 10x1 mm FFKM (item no. 402FF), 3 x o-ring 15x2 mm FFKM (item no. 401FF), 3 x screw M2x5 DIN912 A2.



2164 „Optical window“

1 PEEK screw fitting with optical quartz window; included: 2 x o-ring 5x1 mm FFKM (item no. 407FF).

Spare parts - TSC spectro

Item No.	+ Product Name Description	
2165	„Collimating lens kit“ 2 x SMA adaptor unit including 2 x collimating lens.	
2166	„Fitting for reference electrode“ 1 fitting for capillary-based reference electrode or Ag-pseudo reference electrode, type TSC spectro, and filling set; included: 1 x o-ring 4x1 mm FFKM (item no. 406FF).	
2167	„Tools and screws“ 9 x screw M2x5 DIN912 A2, 9 x screw M2x8 DIN912 A2, 1 x hex key 1.5 mm, 1 x wrench for fixing lateral fittings and plug, 1 x hex key 3 mm.	



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Contact

For any questions with regard to our products, orders, or request for repairs please contact rhd instruments:

info@rhd-instruments.com
Phone: +49 6151 8707187
Fax: +49 6151 8707189
<http://www.rhd-instruments.com>

rhd instruments GmbH & Co. KG
Otto-Hesse-Straße 19 / T3
64293 Darmstadt
Germany

Sitz der Gesellschaft: Darmstadt
Amtsgericht Darmstadt HRA 85824

Haftende Gesellschafterin:
rhd instruments Verwaltungs GmbH
Amtsgericht Darmstadt HRB 96374

Geschäftsführer der rhd instruments Verwaltungs GmbH:
Dr. Benedikt Huber und Dr. Marcel Drüscher



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