

Accessories for electrochemical experiments

Working Electrodes ●●●●●●●●●●●●●●●●

These disk voltammetry electrodes are small and easy to use. All are manufactured in a solvent-resistant CTFE or PEEK plastic body which is embedded with highly polished disks of various electrode materials (glassy carbon, gold, platinum, palladium, nickel, or silver etc.).



Electrode Part	Product Name	Length (mm)	O.D. (mm)	I.D. (mm)	Isolation	Part No.
Platinum	PTE	55	10	5.0	PEEK	002420
		55	6	3.0	PEEK	002422
		55	6	1.6	PEEK	002013
		75	6	1.6	CTFE	MF-2013
		75	6	1.6	CTFE	MF-2071 (3ea/pk)
	SPTE	55	3	1.6	PEEK	002313
	LPTE	110	6	3.0	PEEK	012745
Glassy Carbon	GCE	55	10	5.0	PEEK	002417
		55	6	3.0	PEEK	002012
		55	6	1.6	PEEK	012297
		55	6	1.0	PEEK	002411
		75	6	3.0	CTFE	MF-2012
		75	6	3.0	CTFE	MF-2070 (3ea/pk)
	SGCE	55	3	1.0	PEEK	002412
		55	3	1.6	PEEK	012298
	LGCE	110	6	3.0	PEEK	012744
Gold	AUE	55	10	5.0	PEEK	002418
		55	6	3.0	PEEK	002421
		55	6	1.6	PEEK	002014
		75	6	1.6	CTFE	MF-2014
		75	6	1.6	CTFE	MF-2072 (3ea/pk)
	SAUE	55	3	1.6	PEEK	002314
	LAUE	110	6	3.0	PEEK	012746

Electrode Part	Product Name	Length (mm)	O.D. (mm)	I.D. (mm)	Isolation	Part No.
Plastic Formed Carbon	PFCE	55	6	3.0	PEEK	002408
		55	6	1.0	PEEK	002409
	SPFCE	55	3	1.0	PEEK	011854
Pyrolytic Graphite (Basal Plane)	PGE	55	6	3.0	PEEK	002252
Pyrolytic Graphite (Edge Plane)	PGE	55	6	3.0	PEEK	002253
Silver	AGE	55	10	5.0	PEEK	002416
		55	6	1.6	PEEK	002011
		55	6	3.0	PEEK	002419
		75	6	1.6	CTFE	MF-2011
		55	3	1.6	PEEK	002315
Palladium	PDE	55	6	1.6	PEEK	002019
		75	6	1.6	CTFE	MF-2018
	SPDE	55	3	1.6	PEEK	002319
Nickel	NIE	55	6	1.5	PEEK	002016
		75	6	3.0	CTFE	MF-2016
Copper	CUE	55	6	1.6	PEEK	002017
		55	6	3.0	PEEK	012584
Iron	FEE	55	6	1.5	PEEK	002018
		55	6	3.0	PEEK	012585
Carbon Paste	CPE	55	6	3.0	PEEK	002210
		75	6	3.0	CTFE	MF-2010
		size : 25 * 25mm		single hole dia. 3mm	PEEK	010251
	SGCE	75	6	1.6	CTFE	MF-2015
		55	3	1.6	PEEK	002223
	CPE for RDE	25	12	3.0	PEEK	011973
	Carbon Paste	Paste of uniform graphite particles mixed with a paraffin binder (for use in aqueous media), 1 g				001010
						CF-1010

Microelectrode for Voltammetry

These electrodes consist of small diameter metal wires or fibers (5-100 μm) sealed within tempered glass bodies. The flattened end of the microelectrode is polished to a mirror finish, which can be maintained using the polishing materials



The properties of microelectrodes

- A steady state for a faradaic process is attained very rapidly.
- The faradaic-to-charging current ratio, I_F/I_C , is improved, as the charging current decreases in proportion to decreasing area of the electrode, while the steady-state faradaic current is proportional to its characteristic dimension. Therefore, the I_F/I_C ratio increases with the reciprocal of the characteristic dimension.
- The ohmic drop of potential, IR , is decreased as the measured currents are very low.
- The applied potential can be scanned very rapidly because the charging current is suppressed.
- The signal-to-noise ratio is greatly improved when an individual microelectrode performs under steady-state conditions or when the diffusion layers totally overlap in an array of microelectrodes.

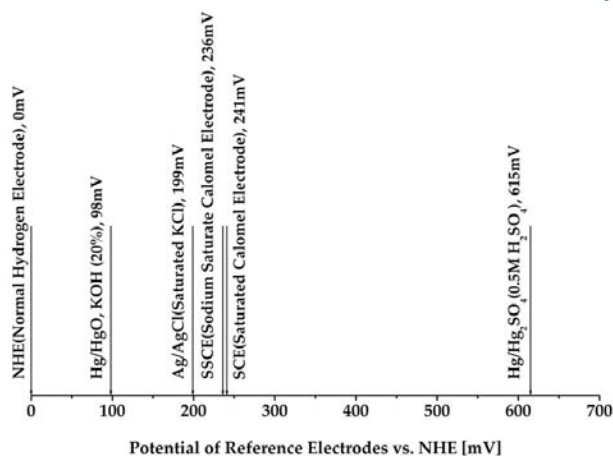
Electrode Part	Product Name	Length (mm)	O.D. (mm)	I.D. (μm)	Isolation	Part No.
Platinum	mPTE	55	4	10	Glass	002005
		55	4	15	Glass	002015
		55	4	25	Glass	002003
		55	4	100	Glass	002009
		75	4	10	Glass	MF-2005
		75	4	100	Glass	MF-2150
		75	4	25	Glass	002003
Gold	mAUE	55	4	10	Glass	002006
		55	4	25	Glass	002004
		55	4	100	Glass	002010
		75	4	10	Glass	MF-2006
Carbon Fiber	mCFE	55	4	7	Glass	002007
		55	4	33	Glass	002002
		75	4	11	Glass	MF-2007
Copper	mCUE	55	4	25	Glass	002271
Tungsten	mCUE	55	4	10	Glass	002272
Nickel	mCUE	55	4	100	Glass	002273

Other Working Electrodes

Reticulated Vitreous Carbon Electrode, RVC	Platinum Gauze Electrode	Platinum Gauze Electrode & Gold Gauze Electrode
 Part No. : MF-2077 Part No. : 010530 • for bulk electrolysis experiment	 Part No. : PGE • for bulk electrolysis experiment • 50mmH * 39mm dia. * 50mL wire	 Part No. : 002250 Part No. : 002251 • Pt gauze electrode • Au gauze electrode • 80mesh, 35*25mm • 100mesh, 35*25mm

Reference Electrodes ●●●●●●●●●●●●●●●●

Potential of various reference electrodes (V vs. NHE)



- NHE (Normal Hydrogen Electrode) ----- 0 mV
- SCE (Saturated Calomel Electrode) ----- 241 mV
- SSCE (Sodium Saturated Calomel Electrode) ----- 236 mV
- Ag/AgCl (Saturated KCl) ----- 199 mV
- Hg/Hg₂SO₄ (0.5M H₂SO₄) ----- 615 mV
- Hg/HgO, KOH (20%) ----- 98 mV
- Ag/Ag₂SO₄ (Ag₂SO₄ & Saturated K₂SO₄) ----- 900 mV

Ag/AgCl Reference Electrode

- simple construction
- stable potential
- non-toxic components

Product Name	Photo	Length (mm)	O.D. (mm)	Porous Junction	Electrode Part	Part No.
Ag/AgCl Reference Electrode		75	6.0	Vycor®	Ag/AgCl/NaCl(3M)	MF-2052 / MF-2079(3/pk)
Ag/AgCl Reference Electrode (for alkaline solution)		30	6.0	Ceramics	Ag/AgCl/NaCl(3M)	MF-2078 (3/pk)
Ag/AgCl Reference Electrode		70	6.0	Vycor®	Ag/AgCl/NaCl(3M)	012167
Ag/AgCl Reference Electrode (for SECM)		40	4.5	Vycor®	Ag/AgCl/NaCl(3M)	012168
Ag/AgCl Reference Electrode (for alkaline solution)		90	6.0	Ceramic	Ag/AgCl/KCl (Saturated KCl)	002058
Ag/AgCl Reference Electrode (for flow cell)		48	10	Vycor®	Ag/AgCl/NaCl(3M)	012169

Calomel Reference Electrode

Product Name	Photo	Length (mm)	O.D. (mm)	Porous Junction	Electrode Part	Part No.
Calomel Reference Electrode		90	6.0	Ceramics	Calomel	002056
Calomel Reference Electrode (Hg is not supplied)		65	5.7	Vycor®	Calomel	MF-2055

Non-Aqueous Reference Electrode

Product Name	Photo	Length (mm)	O.D. (mm)	Porous Junction	Electrode Part	Part No.
Ag/Ag ⁺ Reference Electrode Kit		75	6.0	Vycor®	Ag/Ag ⁺ silver nitrate supplied	MF-2062

Product Name	Photo	Length (mm)	O.D. (mm)	Porous Junction	Electrode Part	Part No.
Ag/Ag ⁺ Reference Electrode Kit		70	6.0	Vycor®	Ag/Ag ⁺ /ACN/TBAP	012171
Ag/Ag ⁺ Reference Electrode Kit (for SECM)		40	4.5	Vycor®	Ag/Ag ⁺ /ACN/TBAP	012172
Ag/Ag ⁺ Reference Electrode Kit (for flow cell)		48	10	Vycor®	Ag/Ag ⁺ /ACN/TBAP Body&Cap material: Polyoxymethylene (POM)	012173
Ag/Ag ⁺ Reference Electrode Kit (for flow cell)		48	10	Vycor®	Ag/Ag ⁺ /ACN/TBAP Body&Cap material: Polyetheretherketone (PEEK)	012174

Mercury Based Reference Electrode

Product Name	Photo	Length (mm)	O.D. (mm)	Porous Junction	Electrode Part	Part No.
Hg/Hg ₂ SO ₄ Reference Electrode (for chloride free analysis)		90	6	Ceramics	Hg/Hg ₂ SO ₄	002057
Hg/HgO Reference Electrode (for high alkaline electrolyte solution)		90	6	Ceramics	Hg/HgO 1M NaOH	011503

Storage Vial for Reference Electrode



- for aqueous solution only
- borosilicate glass
- 12 dia * 32: mm

• Part No. : MR-5275



- for aqueous solution only
- amber color glass vial

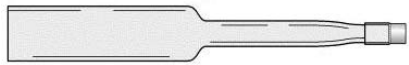
• Part No. : 012108

Vycor® Frit for Reference Electrode

Product Name	Photo	Contents / Description	Q'ty	Part No.
Vycor® Frit & Heat Shrink Teflon Tube Kit		Vycor glass tip, dia 2.85 * 4.0 mm	10	012796
		Heat shrink Teflon tubing, 150 mm	1	
		Vycor glass tip, dia 1/8" * 4.0 mm	5	MF-2064
		Heat shrink Teflon tubing, 8 mm	6	
Heat shrink Teflon Tubing		Length : 10 cm	1	012183
		Length : 12" (30 cm)	1	MF-2027

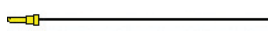
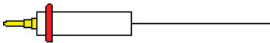
Glass Tube with Vycor® Frit

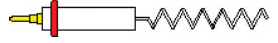
These products enable to take electrochemical measurement by only 200 µL of the analyte with voltammetry cells. A vycor® glass tip is attached to the end of its glass tube, and ions transmit freely.

Photo	ID (mm)	OD (mm)	Length (mm)	Q'ty/pk	Part No.
	6	6	75	1	MF-2042
	6	10.4	120	1	MF-2030
	2	4.5	40	2	012175
	4	6	55	2	012176
	4	6	55	22	012306
	7	9	55	2	012177
	7	9	55	22	012307

Counter Electrodes ●●●●●●●●●●●●●●●●

Platinum wire counter electrodes are available in a variety of lengths. Gold and nickel counter electrodes are also available.

Product Name	Photo	Length (mm)	Wire Dia. (mm)	Application	Part No.
Platinum Wire Counter Electrode		6	0.5	for VC-2 cell	MW-4130
Platinum Wire Counter Electrode		5	0.5	for VC-2, VC-4, MCA, Plate material evaluating kit	002222
Platinum Wire Counter Electrode		7.5	0.5	for C-3 cell stand	MW-1032

Product Name	Photo	Length (mm)	Wire Dia. (mm)	Application	Part No.
Platinum Wire Counter Electrode		5	0.5	for VC-3, SVC-3	002233
Coiled Platinum Wire Counter Electrode		23	0.5	for RDE & bulk electrolysis cell	MW-1033
Coiled Platinum Wire Counter Electrode		23	0.5	for RRDE & bulk electrolysis cell	002234
Gold Counter Electrode		23	0.5	for RRDE & bulk electrolysis cel	012638
Nickel Counter Electrode		23	0.5	for RRDE & bulk electrolysis cel	012639
Stainless Steel Counter Electrode		5	1.6	stainless steel, for flow cell	012198
Graphite Rod		150	OD : 6	for PTC1 & PTC2	GR002H
Graphite Rod		300	OD : 6	for CCK1 & WCCK1	GR002
Flag Type Counter Electrode	 active area : 5cm ²	150	OD : 6	the rod is isolated by a glass tube, for CCK1 & WCCK1	PFL

RDE/RRDE Rotator & Electrodes ●●●●●●●●●●●●●●●●

RRD-2 Rotating Ring Disk Electrode Apparatus

The RDE-2 is a rotator system for both fixed rotation rate and hydrodynamic modulation rotating disk electrochemical experiments. The short titanium shaft and 1/4" diameter electrode provide for an extremely low-inertia system capable of rotation rates from 50 to 10,000 RPM at better than 1% accuracy. The rotator unit is manually raised and lowered, and can be inverted for spin-coating.



● Part No. : EF-1100

RDE Tips



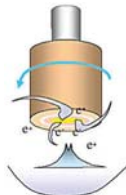
Product	Description	Part No.
glassy carbon RDE tip	3mm dia.	MF-2066
platinum RDE tip	3mm dia.	MF-2067
gold RDE tip	3mm dia.	MF-2068

RRDE-3A Rotating Ring Disk Electrode Apparatus

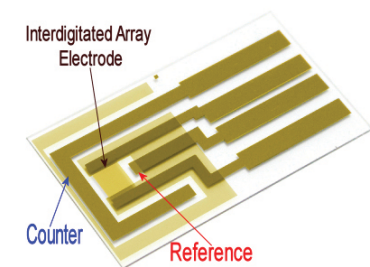
RRDE-3A is a constant rotation system for use in hydrodynamic modulation rotating ring disk electrochemistry. A 7 mm diameter electrode with short stainless steel shaft provides for a miniature and concentric circle electrode system that is capable for highly accurate rotation and modulation even at radial modulation rates or wave forms. Electrodes are small and rapidly interchangeable.

● Part No. : 012180

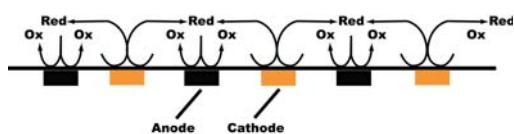


RDE Electrode	RRDE Tips																																						
 - length : 25mm - OD : 12mm - disk diameter : 3mm <table border="1"> <thead> <tr> <th>Product</th><th>Part No.</th></tr> </thead> <tbody> <tr><td>glassy carbon RDE electrode</td><td>011169</td></tr> <tr><td>platinum RDE tip</td><td>011170</td></tr> <tr><td>gold RDE tip</td><td>011171</td></tr> <tr><td>aluminum RDE tip</td><td>011966</td></tr> <tr><td>silver RDE tip</td><td>011967</td></tr> <tr><td>copper RDE tip</td><td>011968</td></tr> <tr><td>nickel RDE tip</td><td>011969</td></tr> <tr><td>tantalum RDE tip</td><td>011970</td></tr> <tr><td>titanium RDE tip</td><td>011971</td></tr> <tr><td>tungsten RDE tip</td><td>011972</td></tr> <tr><td>carbon paste RDE tip</td><td>011973</td></tr> </tbody> </table>	Product	Part No.	glassy carbon RDE electrode	011169	platinum RDE tip	011170	gold RDE tip	011171	aluminum RDE tip	011966	silver RDE tip	011967	copper RDE tip	011968	nickel RDE tip	011969	tantalum RDE tip	011970	titanium RDE tip	011971	tungsten RDE tip	011972	carbon paste RDE tip	011973	 - length : 25mm - OD : 12mm - disk diameter : 4mm - ring size : 5.0mmID / 7.0mmOD - gap : 0.5mm <table border="1"> <thead> <tr> <th>Product</th><th>Part No.</th></tr> </thead> <tbody> <tr><td>Pt ring / GC disk electrode</td><td>012613</td></tr> <tr><td>Pt ring / Pt disk electrode</td><td>012614</td></tr> <tr><td>Pt ring / Au disk electrode</td><td>012615</td></tr> <tr><td>Au ring / GC disk electrode</td><td>012616</td></tr> <tr><td>Au ring / Pt disk electrode</td><td>012617</td></tr> <tr><td>GC ring / GC disk electrode</td><td>012618</td></tr> </tbody> </table> 	Product	Part No.	Pt ring / GC disk electrode	012613	Pt ring / Pt disk electrode	012614	Pt ring / Au disk electrode	012615	Au ring / GC disk electrode	012616	Au ring / Pt disk electrode	012617	GC ring / GC disk electrode	012618
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IDA Electrodes



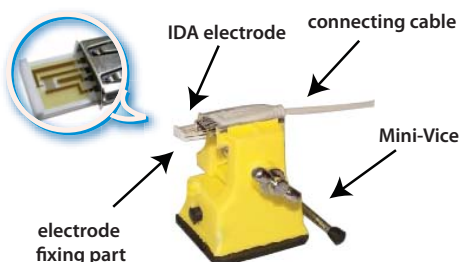
IDA (Interdigitated Array) Electrode have gained popularity as an alternative transducer in electrochemical experiments. Interdigitated 65 pairs of generator/collector electrodes set off electrochemical RedOx cycling continuously as shown below. This reaction significantly boosts sensitivity of the electrode. Furthermore, samples are preserved when Dual (Red-Ox) Mode is chosen - Not like as Single Mode eats up samples at measurements.



Product	Width (μm)	Interval (μm)	Length (mm)	Part No.
IDA electrode (Au)	10	5	2	012125 / 012259*
IDA electrode (Pt)				012126 / 012262*
IDA electrode (C)				012127 / 012266*
IDA electrode (ITO)				012128 / 012265*
IDA electrode (Au)	3	3	2	012129 / 012260*
IDA electrode (Pt)				012130 / 012263*
IDA electrode (Au)	2	2	2	012257 / 012261*
IDA electrode (Pt)				012258 / 012264*

(*) IDA electrode without passivation membrane

Cell Kit for IDA Electrode



Part No. : 011066

Ag/AgCl Ink for Reference Electrode

Reference electrodes can be easily prepared by coating Ag/AgCl ink on the metal(Ag, Pt, Au, etc.) surface.

- surface resistance : 0.2 Ω/sq/25.4 μm
- viscosity stands : 50,000 ± 10,000 CP @21.1°C



Part No. : 011464

Ring Disk Type Electrodes ●●●●●●●●●●●●●●●●

Available as a working electrode of radial flow cells, achieves complete reduction/oxidation on the center disk at ultra-low flow rate because of its fine coulometric electrolysis efficiency. This also enables to analyze subsequent reaction as well as identification and quantitation of the sample at the same time. Furthermore, this electrode becomes capable of measuring hydrogen peroxide at zero volt by fixing Osmium Gel / HRP (Horseradish Peroxidase).



Ring Disk Electrode	Ring (mm)		Length (mm)	Q'ty/pk	Part No.
	OD	ID			
gold electrode	6	4	3	3	002081
platinum electrode	6	4	3	3	002082
carbon electrode	6	4	3	3	002083

ITO Electrodes ●●●●●●●●●●●●●●●●

The ITO electrodes consist of 100 nm thick of ITO layer deposited on quartz glass substrate (0.5 mm thick).

● ITO electrode without connector



● IDA type ITO electrode

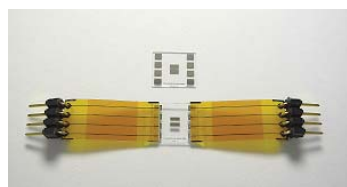


Product Name	Description	Q'ty	Part No.
ITO electrode	for flow cell	4pcs	011519
ITO electrode	8*27mm	12pcs	011465
ITO disk	4 inch	1pc	011827
ITO electrode	10*10mm	30pcs	011233
ITO electrode	10*20mm	10pc	010887
IDA electrode	10um	1pc	012128
IDA electrode	10um	1pc	012265*

(*) IDA electrode without passivation membrane

Conductivity Electrodes ●●●●●●●●●●●●●●●●

Platinum terminals are deposited on a fused quartz substrate as current supplying electrodes and potential difference probing electrodes. The distance between electrodes for potential difference are adjustable from 40 μm to 250 μm by changing the connect pin.



Product Name	Q'ty	Part No.
conductivity electrode	1pc	011316
conductivity electrode (without connector)	1pc	011598
connector for printed electrodes	1pc	011839
IC clip for printed electrodes (4 pcs)	4pcs	011840

Flow Cell ●●●●●●●●●●●●●●●●

Flow Pattern

Generally radial-flow cells are best suited for microbore systems and cross-flow for standard systems.



Cross Flow Cell

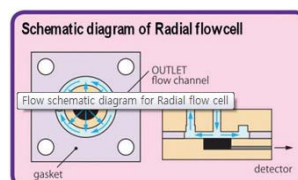
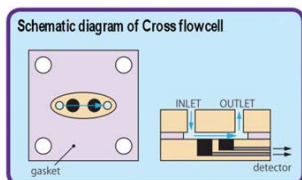
Cross flow cell is capable of quantitation at the level of 10-15mol by the flow rate: 1mL/min - 100 $\mu\text{L}/\text{min}$. Working electrode, reference electrode and gasket should be purchased separately.

- detection electrode for HPLC
- electrode for flow injection
- electrode for bio-sensor development

Radial Flow Cell

Radial flow cell is developed for microbore chromatography. Its detecting efficiency will improve when flow rate is 10 $\mu\text{L}/\text{min}$ or lower. This flow cell consists of thin layer electrode and symmetric design. Working electrode, reference electrode and gasket should be purchased separately.

Flow Cell from ALS



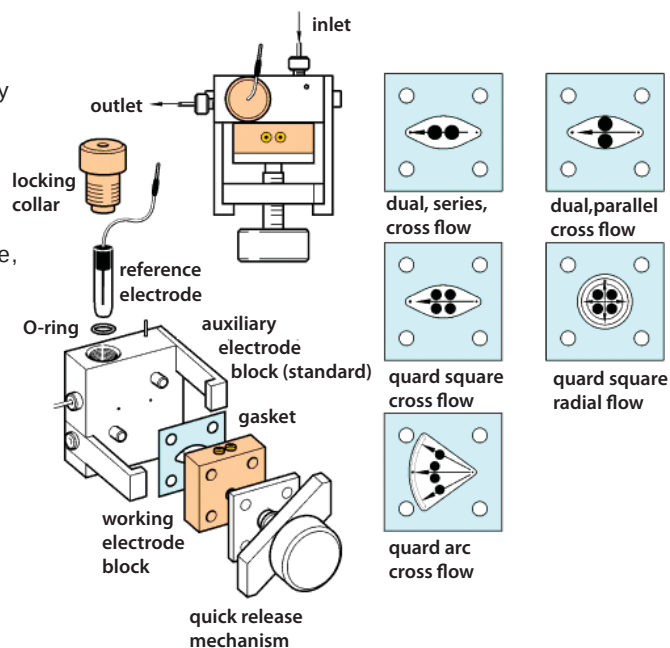
Cross Flow Cell			
• cross flow cell structure			
			
cross flow cell	working electrode	gasket	reference electrode
Product		Part No.	
cross flow cell		012798	
Working Electrode			
glassy carbon electrode	dia. 3mm*2 (dual type), size: 25*25mm	001000	
gold electrode		001002	
platinum electrode		001012	
silver electrode		001008	
carbon paste electrode		001004	
nickel electrode		001009	
glassy carbon/gold electrode		001006	
glassy carbon/platinum electrode		012583	
Reference Electrode			
Ag/AgCl reference electrode		012169	
Ag/AgCl reference electrode		012170	
Ag/AgCl non aqueous reference electrode(Ag/Ag+)		012173	
Ag/AgCl non aqueous reference electrode(Ag/Ag+)		012174	
Gasket			
TG-2M Teflon gasket	12μm: 4pcs	001046	
TG-5M Teflon gasket	25μm: 4pcs	001047	
TG-6M Teflon gasket	50μm: 4pcs	001048	
TG-8M Teflon gasket	100μm: 4pcs	012801	
TG-11M silicon gasket	500μm: 4pcs	001092	
TG-12M silicon gasket	1000μm: 4pcs	001093	

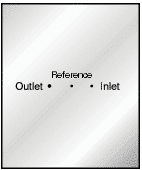
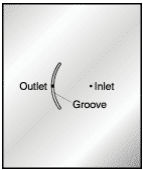
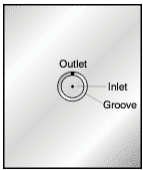
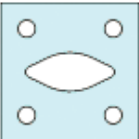
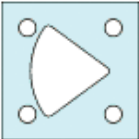
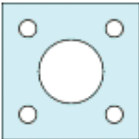
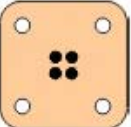
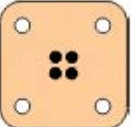
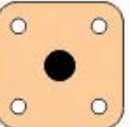
Radial Flow Cell			
• radial flow cell structure			
			
radial flow cell	working electrode	gasket	reference electrode
Product		Part No.	
radial flow cell		012799	
Working Electrode			
glassy carbon electrode	dia.6mm(single type)	001016	
copper electrode	size: 25*25mm	010941	
glassy carbon electrode	dia.3mm(single type) size: 25*25mm	012124	
platinum electrode		009908	
gold electrode		011155	
PFCE carbon electrode		000999	
carbon paste electrode		010251	
Reference Electrode			
Ag/AgCl reference electrode		012169	
Ag/AgCl reference electrode		012170	
Ag/AgCl non aqueous reference electrode(Ag/Ag+)		012173	
Ag/AgCl non aqueous reference electrode(Ag/Ag+)		012174	
Gasket			
TG-2MR Teflon gasket	12μm: 4pcs	001146	
TG-5MR Teflon gasket	25μm: 4pcs	001147	
TG-6MR Teflon gasket	50μm: 4pcs	001148	
TG-8MR Teflon gasket	100μm: 4pcs	012802	
TG-11MR silicon gasket	500μm: 4pcs	001192	
TG-12MR silicon gasket	1000μm: 4pcs	001193	

Flow Cell from BASi

To purchase a complete flow cell, order an auxiliary electrode(counter electrode) and a cell kit.

- The auxiliary electrode includes a phenolic base, arms, and exit tube.
- The cell kit includes a glassy carbon working electrode, gasket, reference electrodes, the retaining hardware for these electrodes, and a polishing kit.



Flow Pattern		
Cross	Arc	Radial
Auxiliary Electrodes  • MF-1093  • MF-1092	 • MF-1087	 • MF-1091
Cell Kits  Cell kit includes: • MF-1000 glassy carbon working electrode • MF-1046 gaskets, 0.002 inch, standard • MF-2060 electrode polishing kit • MW-2030 Ag/AgCl reference electrode • MR-3608 threaded reference electrode retainer • MR-3609 clamp screw • MR-3741 dowel plate • MR-3742 clamp screw	 Cell kit includes: • MF-1086 electrode block • MF-1066 electrode block • MF-2060 electrode polishing kit • MW-2030 Ag/AgCl reference electrode • MR-3608 threaded reference electrode retainer • MR-3609 clamp screw • MR-3741 dowel plate • MR-3742 clamp screw	 Cell kit includes: • MF-1095 electrode: single glassy carbon working, 3 mm • MF-1068 gaskets, 0.0005 inch • MF-2060 electrode polishing kit • MW-2030 Ag/AgCl reference electrode • MR-3608 threaded reference electrode retainer • MR-3609 clamp screw • MR-3741 dowel plate • MR-3742 clamp screw
Replacement Gaskets  • MF-1044 0.0005" • MF-1046 0.002" • MF-1047 0.005" • MF-1048 0.015"	 • MF-1067 0.0005" • MF-1066 0.002"	 • MF-1068 0.0005" • MF-1069 0.002"
Replacement Working Electrode Blocks    • MF-1095 • MF-1000 • MF-1085	 • MF-1086	   • MF-1095 • MF-1085 • MF-1015

Glassy Carbon Products ●●●●●●●●●●●●●●●●

Product Name	Photo	Size	Part No.
Glassy Carbon Rod		OD 1.0 * 100 mm	010761
		OD 2.0 * 100 mm	010762
		OD 3.0 * 100 mm	010763
Glassy Carbon Plate		1.0 * 25 * 25 mm	012086
		2.0 * 25 * 25 mm	012087
		3.0 * 25 * 25 mm	012088

Product Name	Photo	Size	Part No.
Glassy Carbon Film		0.1 * 25 * 25 mm	012089
Glassy Carbon Powder		0.4–12 μm, 10 g	012090
		10–20 μm, 10 g	012091
		20–50 μm, 10 g	012092
		40–80 μm, 10 g	012093
		80–200 μm, 10 g	012094

Polishing Kit for Working Electrodes ●●●●●●●●●●

- Renew and recycle valuable working electrodes
- Use for all types of working electrodes, including microelectrodes

Product Name	Photo	Description	Part No.
Polishing Kit		• 15 μm coarse diamond polish(2ml) • 3 μm fine diamond polish (2ml) • 1 μm very fine diamond polish (2ml) • 0.05 μm alumina polish (7ml) • fine grit pads (5pcs) • brown Texmet/alumina pads (5pcs) • nylon/diamond pads (10pcs) • glass plates (2pcs) Each component can be purchased separately. Please contact us.	MF-2060
		• 0.05 μm polishing alumina (20 ml) • 1 μm polishing diamond (10 ml) • alumina polishing pad (10 pcs) • diamond polishing pad (10 pcs) • glass plate for PK-3 (1 pc) Each component can be purchased separately. Please contact us.	011975

Electrode Holder ●●●●●●●●●●

- max. hole size
10mm dia. * 1 ea
9.6mm dia. * 1 ea
6.2mm dia. * 1 ea
1.6mm dia. * 1 ea
- max. height : 150mm
- material : Teflon® & stainless steel
- electrodes & glass vial are not included.

● Part No. : UEH1



Controlled Growth Mercury Electrode



The mercury drop is grown by a series of pulses that open the capillary valve. The number of pulses, their duration, and their frequency can be varied by PC control, providing great flexibility in both the drop size and its rate of growth. This CGME mode can be used for both polarographic and stripping experiments.

- wide range of drop sizes
- DME(Dropping Mercury Electrode), SMDE(Static Mercury Drop Electrode), and CGME(Controlled Growth Mercury Drop Electrode) modes
- HMDE(Hanging Mercury Drop Electrode) available in SMDE and CGME modes
- fast response time
- rapid drop stabilization
- easy maintenance
- minimal metal contact reduces metal contamination
- mounted magnetic stirrer with 50-800 rpm
- manual and remote control of mercury dispense, drop knock, stirrer on/off, inert gas purge/blanket
- minimal chance of mercury spills



♦ Part No. : EF-1400

Faraday Cages



C3 Cell Stand	CS-3A Cell Stand	Farad2
 ♦ Part No. : EF-1085 • manual or remote control of gas purge/blanket • manual or remote on-off control of magnetic stirrer • optional water-jacketed cell vial • standard accessories package: glassy carbon & Pt working electrodes, Ag/AgCl reference electrodes with storage vial, Pt counter electrode, polishing kit, standard glass cell vials (12pcs), low volume cell vials, stir bar, cell lead clips, & gas line tubing	 ♦ Part No. : 012779 • gas line connection is easy and quick • gas purge blanket controls On/Off either manually or remotely • manual & remote-controlled On/Off of magnetic stirrer • adjustment of magnetic stirring rate is controlled manually • size : 286W * 230D * 320H mm	 ♦ Part No. : Farad2 • well designed to block out external EMI noise • dimensions – overall : 300W * 398H * 300D mm – window : 100W * 300H mm • material – exterior : powder-coated steel – interior : powder-coated steel with Teflon®-coated bottom – window : fine SUS mesh embedded in acryl plates • access – quantity : 2 holes – size : 10mm dia. – position : right hand side & back side

Spectroelectrochemical Cell Kit



Spectroelectrochemistry(SEC) is aimed at the investigation of electrochemical reaction mechanism and the interface structure between electrolyte solution and electrode. This cell is the combination of a thin-layer electrochemical vessel and a quartz cuvette (1mm or 0.5mm path length) designed to be used in a standard UV-VIS spectrometer.

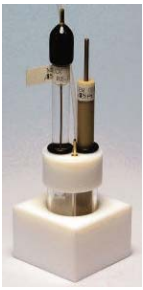


left)0.5mm / right) 0.1mm path length cell

SEC-C Thin Layer Quartz Glass Spectroelectrochemical Cell Kit																																																						
1mm path length			0.5mm path length																																																			
<table><tr><th>Product</th><th>Part No.</th></tr><tr><td>spectroelectrochemical cell kit(Pt)</td><td>012810</td></tr><tr><td>spectroelectrochemical cell kit(Au)</td><td>012811</td></tr><tr><th colspan="2">Contents</th></tr><tr><td>Pt gauze working electrode (for 012810)</td><td>011498</td></tr><tr><td>Au gauze working electrode (for 012811)</td><td>012017</td></tr><tr><td>Pt counter electrode</td><td>011499</td></tr><tr><td>glass cell (light pass length: 1 mm)</td><td>012812</td></tr><tr><td>teflon cap</td><td>011501</td></tr><tr><td>purging tube</td><td>010537</td></tr><tr><th colspan="2">Optional Items</th></tr><tr><td>Ag/AgCl reference electrode</td><td>012167</td></tr><tr><td>Ag/AgCl non aqueous reference electrode(Ag/Ag+)</td><td>012171</td></tr></table>	Product		Part No.	spectroelectrochemical cell kit(Pt)	012810	spectroelectrochemical cell kit(Au)	012811	Contents		Pt gauze working electrode (for 012810)	011498	Au gauze working electrode (for 012811)	012017	Pt counter electrode	011499	glass cell (light pass length: 1 mm)	012812	teflon cap	011501	purging tube	010537	Optional Items		Ag/AgCl reference electrode	012167	Ag/AgCl non aqueous reference electrode(Ag/Ag+)	012171	<table><tr><th>Product</th><th>Part No.</th></tr><tr><td>spectroelectrochemical cell kit(Pt)</td><td>012813</td></tr><tr><td>spectroelectrochemical cell kit(Au)</td><td>012814</td></tr><tr><th colspan="2">Contents</th></tr><tr><td>Pt gauze working electrode (for 012813)</td><td>012606</td></tr><tr><td>Au gauze working electrode (for 012814)</td><td>012607</td></tr><tr><td>Pt counter electrode</td><td>012609</td></tr><tr><td>glass cell (light pass length: 1 mm)</td><td>012815</td></tr><tr><td>teflon cap</td><td>011501</td></tr><tr><td>purging tube</td><td>010537</td></tr><tr><th colspan="2">Optional Items</th></tr><tr><td>Ag/AgCl reference electrode</td><td>012167</td></tr><tr><td>Ag/AgCl non aqueous reference electrode(Ag/Ag+)</td><td>012171</td></tr></table>	Product	Part No.	spectroelectrochemical cell kit(Pt)	012813	spectroelectrochemical cell kit(Au)	012814	Contents		Pt gauze working electrode (for 012813)	012606	Au gauze working electrode (for 012814)	012607	Pt counter electrode	012609	glass cell (light pass length: 1 mm)	012815	teflon cap	011501	purging tube	010537	Optional Items		Ag/AgCl reference electrode	012167	Ag/AgCl non aqueous reference electrode(Ag/Ag+)	012171
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Votammetry Cell Kit



 • Contents : glass sample vial(1pc), glass vial(1pc), Teflon top, gas purge line, carbon paste voltammetry electrode, carbon paste, Pt counter electrode & Ag/AgCl reference electrode • Part No. : MF-1065 ● Microvolume Voltammetry Cell Kit	Cell Volume: 50ul  • Contents : glass sample vial(7pcs), Pt counter electrode, Teflon cap, cell holder & purging tube • working & reference electrode are not included. • Part No. : 011224 ● VC-4 Voltammetry Cell Kit
 • Contents : glass sample vial, cell top, sample chamber with O-ring, reference electrode, counter electrode, port plug(2pcs), & replacement vycor frits • Part No. : MF-2041 ● Low Volume Cell for C-3 Cell Stand	Cell Volume: 20ml  • Contents : glass sample vial(7pcs), Teflon top, Pt counter electrode, Teflon tubing (for gas purging) • working & reference electrode are not included. • Part No. : MF-1052 ● VC-2 Voltammetry Cell Kit
 • Contents : glass sample vial(7pcs), Pt counter electrode, Teflon cap & purging tube • working & reference electrode are not included. • Part No. : 012668 ● SVC-2 Voltammetry Cell Kit	Cell Volume: 20ml  • Contents : glass sample vial(7pcs), Pt counter electrode(5cm), Teflon cap & purging tube • working & reference electrode are not included. • Part No. : 012669 ● SVC-3 Voltammetry Cell Kit
 • designed for the complete electrolysis of a solution species • large surface-area reticulated vitreous carbon working electrode • contents : glass cell, reticulated vitreous carbon working electrode, Ag/AgCl reference electrode, counter electrode with chamber, Teflon gas tubing, Teflon cap & stir bar • Part No. : MF-1056 ● Bulk Electrolysis Cell Kit	Cell Volume: 100ml  • quantitation of mass transfer of the electron per molecule • measuring the absolute quantity of the analyte • contents : glass cell, porous carbon electrode, Pt counter electrode(23cm), lid & chamber for counter electrode, Teflon cap, gas purging tube & stir bar • Part No. : 001197 ● Bulk Electrolysis Cell Kit

Sample Vial

Various shapes and sizes of PYREX glass cell vials are available.



Standard Type			
24mm * 62mm 5~10ml	25mm * 50mm 5~15ml	50mm * 59mm 5~15ml	51mm * 51mm 2~15ml
• volume : 10ml • quantity : 6pcs • for microcell & VC-2 cell	• volume : 15ml • quantity : 6pcs • for C-1 and C-2 cell stands	• volume : 15ml • quantity : 12pcs • for C-3 Cell Stand, CGME & RDE-2	• volume : 15ml • quantity : 1pc • material : Teflon • for C3, CGME, RDE-2
MF-1083	MF-1082	MR-1208	MR-1205
51mm * 51mm 2~15ml	51mm * 72mm 25~75ml	70mm * 90mm 20~50ml	 18mm * 30mm
• volume : 15ml • quantity : 6pcs • for microcell & VC-2 cell	• volume : 15ml • quantity : 1pc • for bulk electrolysis cell	• volume : 50ml • quantity : 1pc • for RDE-1	• volume : 5ml • quantity : 10pcs • for VC-4 cell
MF-1084	MR-1195	MR-3760	011504
 28mm * 50mm	 50/35mm * 58.5/45mm	 35mm * 40mm	 45mm * 55mm
• volume : 20ml • quantity : 10pcs • for SVC-2 & SVC-3 cell	• volume : 20ml • quantity : 10pcs • for RDE-2 & RRDE-3	• volume : 20ml • quantity : 10pcs • for general uses	• volume : 50ml • quantity : 5pcs • for general uses
001056	012061	GV20	GV50
 55mm * 80mm	 50mm * 72mm	 70mm * 100mm	
• volume : 100ml • quantity : 2pcs • for general uses	• volume : 100ml • quantity : 1pc • for bulk electrolysis cell & RRDE-3A	• volume : 200ml • quantity : 1pc • for general uses	
GV100	012632	GV200	

Corrosion Cell Kit ●●●●●●●●●●●●●●●●

General Corrosion Cell Kit

- volume : 1 liter
- material : Teflon®, Pyrex® and SUS316
- cylindrical metal sample working electrode, Luggin capillary & gas bubbling tube are included.
- counter electrode(graphite rod or Pt wire) & reference electrode are not included.

Standard Type	Water Jacket Type	Flat Specimen Holder
		
● Part No. : CCK1	● Part No. : WCCK1	● Part No. : FSH2

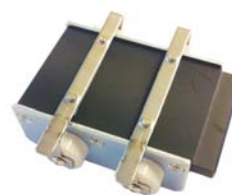
Plate Material Testing Cell

- designed to evaluate plate material such as metal, semi-conducting plate, etc.

Plate Test Cell Kit	Plate Test Cell Kit	Plate Test Cell Kit
 ● Part No. : PTC1 • sample size width: >15mm, thickness: 0.1~10mm • electrodes are not included.	 ● Part No. : PTC2 • sample size : > 6cm on each side • sample thickness : up to 10cm • test solution required : max. 450ml • electrodes are not included.	 ● Part No. : 011951 • sample size : width : 10~20mm, thickness : ~3mm • Pt counter electrode is included. • reference electrode is not included.
Flat Cell Kit, Standard Type & Water-Jacketed Type		
 ● Part No. : FCK2	 ● Part No. : WFCK2	• sample test area – right hand side : 1cm² – left hand side : 5cm² • sample thickness : up to 10mm • cell volume : 300ml • graphite counter electrode is included. • reference electrode is not included. • material : Pyrex® & polycarbonate

DSSC Jig ●●●●●●●●●●●●●●●●

- for dye-sensitized solar cell (DSSC)
- fixing solar cell by semiconductor magnetic catch
- sample size : 60*25mm



● Part No. : DSJIG

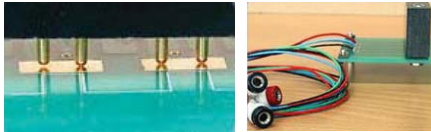
Black Box ●●●●●●●●●●●●●●●●

- housing for spectroscopic experiments



● Part No. : BB1

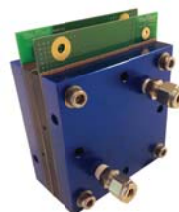
Battery Jig & Holder ●●●●●●●●●●●●●●●●

Universal Battery Jig	Lithium Polymer Battery Test Jig
 • easy to install different size battery to the jig by pulling up the lever • wide contact point with gold coated contact area • coin cell is available without any attachment. • individual operation is available. • 4 contact point(Kelvin probe type) to minimize voltage measurement error. • front panel attachment option is available. ● Part No. : UBJ	 • easy to install lithium polymer battery to the jig by pressing pull-up lever • wide contact point with gold coated contact area • useful for various size of lithium polymer batteries • single or 8 ea of lithium polymer battery jig set • for bundle of batteries application, cabinet type of jig is available. ● Part No. : LPBJ
Coin Cell Battery Test Jig	Coin Cell Holder & Pouch Jig
 • easy to install different size battery into the jig by pulling up the lever • wide contact point (2 probe contact) • rack type jig is also available. ● Part No. : CCBJ	 • coin cell holder with cell connector ● Part No. : BPJ24 ● Part No. : BPJ32 ● Part No. : BPJ40 ● Part No. : BPJ48 ● Part No. : BPJ56 ● Part No. : BPJ64 • pouch jig for 24, 32, 40, 48, 56, 64 channels

Fuel Cell Hardware Fixtures ●●●●●●●●●●●●●●●●

- for PEMFC & DMFC
- max temperature : <200°C
- active area : 5, 10, 25, 50, 100 cm²
- includes serpentine flow pattern, cartridge heater(2), current collector(2), cell graphite(2), end plate(2) & connector.
- MEA is not included.

- Part No. : SCFC5
- Part No. : SCFC10
- Part No. : SCFC25
- Part No. : SCFC50
- Part No. : SCFC100



single serpentine flow pattr
for SCFC5

triple serpentine flow pattr
for SCFC25

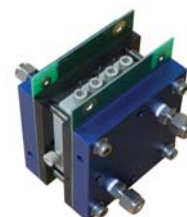
Membrane Conductivity Cell ●●●●●●●●●●●●●●●●

The membrane conductivity cell, MCC, is designed to measure ionic conductivity by simply loading a membrane into cell hardware. The MCC adopts 4 point probe for measuring conductivity.

- four electrode technique
- cell material : PEEK
- operating temperature : to 130°C
- fuel cell hardware available :
5, 9, 25 and 25 cm² fuel cell test hardware (not included, provided by WonATech)
- easy to assemble



● Part No. : MCC



● MCC with fuel cell hardware

Electronic Load ●●●●●●●●●●

- for single or multichannel operation
- 4 current range & 4 voltage ranges
- constant current range : 100A, 50A, 10A, 5A
- constant voltage range : 10V, 5V, 2V, 1V



- Part No. : WEL100
- Part No. : WEL200
- Part No. : WEL300
- Part No. : WEL400

- max. current : 100A
- max. voltage : 50V
- max. power :
 - WEL100 : 100Watt
 - WEL200 : 200Watt
 - WEL300 : 300Watt
 - WEL400 : 400Watt

Softwares

For Data Analysis Software

EIS Data Analysis Software, ZMAN

- model simulation and fitting
- 2D- and 3D-Bode- and Nyquist plots
- automatic equivalent circuit model search function
- project concept to handle multiple EIS data analysis
- parameter plot from fitted elements value
- compatible with data format from Zahner, Gamry, Ametek etc.(needs License code)
- various weighting algorithm
- model library and user model
- KK plot
- batch fitting for project data
- impedance parameter Simulation

DC Data Analysis Software, IVMAN

- electrochemical analysis software
- ideal for DC corrosion data analysis & electro-analytical data analysis
- initial guessing function on Tafel analysis
- automatic Tafel fitting
- polarization resistance fitting
- 3D graph
- find peak function
- interpolation, differentiation, integration etc.
- reporting function

For Instrument Control Software

Dynaload Control Software, LoadRunner

- TDI's dynaload control software
- via IEEE488, RS232C, LAN
- for TDI model RBL488, XBL series
- virtual front panel operation
- schedule file operation
- real time graphic
- excel file conversion
- GPIB card & cable is needed for IEEE488 interface

Ismatec Pump Control Software, Ismatec Player

- control mixing pumps to generate target concentration
- automatic pump and pump head identification
- simple set-up & easy control
- setting parameters: concentration, flow rate, & dispensing volume
- MeOH concentration control for DMFC test

Single Channel Potentiostat/Galvanostat, WPG Series

Standard Type, WPG100



High Power Type, WPG100HP



Multi-Channel Potentiostat/Galvanostat, WMPG Series

Standard Type, WMPG1000S



Low Current Type, WMPG1000L



High Power Type, WMPG1000HP



Mid Power Type, WMPG1000M2



Battery Cycler, WBCS Series

Standard Type, WBCS3000S



Low Current Type, WBCS3000L



Mid Power Type, WBCS3000M2



High Power Type, WBCS3000HP



Fuel Cell Test Station, Smart / WFCTS / Dolphin Series

Smart Series
for PEM/DM/PEM&DMFC



WFCTS Series
for Custom Made



Dolphin Series
for SOFC



Products Designed By ZIVE LAB

Single Channel Potentiostat/Galvanostat/ZRA, SP Series

SP2



SP5



ED2



Multi-Channel Potentiostat/Galvanostat/ZRA, MP Series

MP2



MP2C



MP5



Bi-Potentiostat/Galvanostat/ZRA

BP2



Portable Potentiostat/Galvanostat/ZRA

PP1



Impedance Monitor

Zcon



Z#



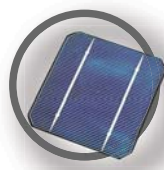
Find Your Solution with us . . .



Battery



Super Capacitor



Solar Cell



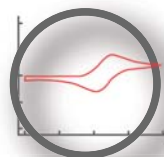
Fuel Cell



Corrosion



Sensor



General
Electrochemistry



WonATech Co., Ltd.

Head Office / R&D Center

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Factory

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