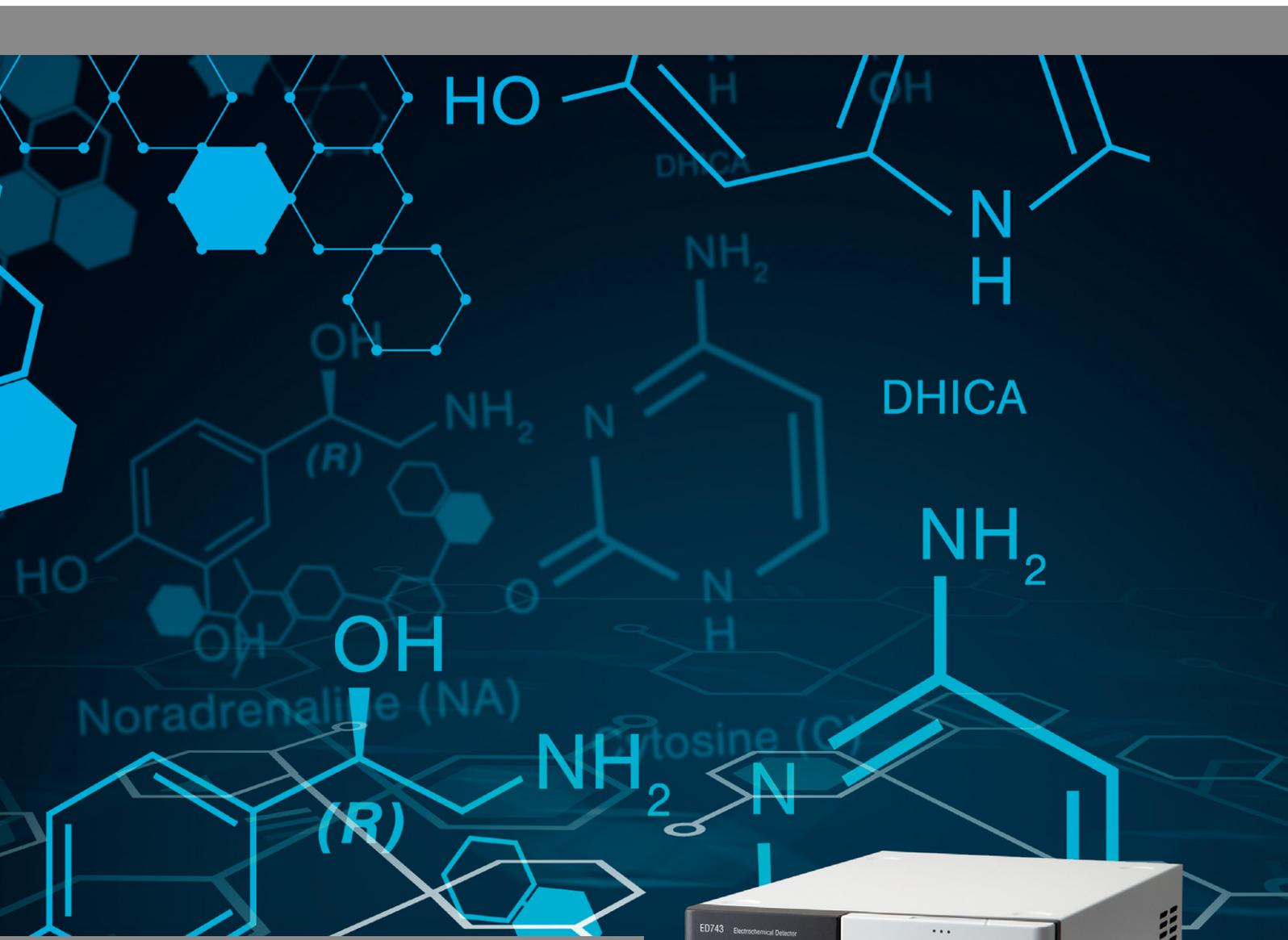


Chromatography Products

Electrochemical Detector for HPLC

ED743: Advanced Detection Technology for Unmatched Sensitivity



Selective Detection
High Sensitivity
Stable Performance



Electrochemical Detector for HPLC ED743



The electrochemical detector is a highly sensitive and selective device used for detecting compounds that readily undergo oxidation or reduction. Since releasing our first model, the ED623, in 1996, GL Sciences has continually enhanced its technology with subsequent models—ED703, ED703 Pulse, and ED723.

Now, with over 20 years of accumulated expertise, we proudly introduce the fifth-generation ED743.

The ED743 offers enhanced sensitivity for sugar analysis using a gold electrode, simplified maintenance, and other improvements.

From design and production to final inspection, every stage is conducted in Japan under strict quality control at our ISO 9001-certified facility.

▶ Highly sensitive detection for electrochemically reactive compounds (10 to 100 times more sensitive than UV detector)

▶ No electrode polishing required
Built-in online electrode cleaning function (diamond electrode)

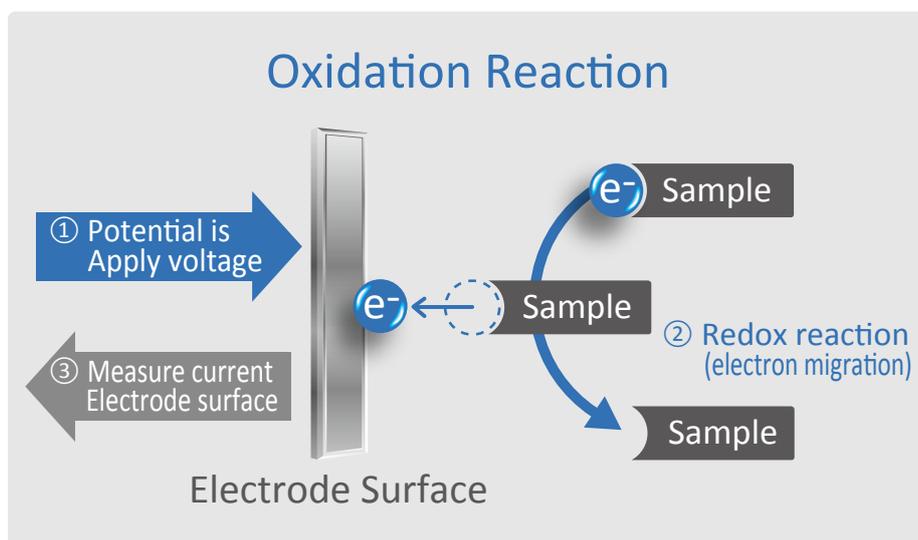
▶ Highly sensitive detection of sugars (Gold electrode: Approximately 3 times higher SN ratio than our previous model)

▶ Improved maintainability
Pursuing further ease of use compared to conventional product

What Is an Electrochemical Detector?

Principles of Detection

- ① A voltage is applied to the electrodes within the detector cell.
- ② The analyte migrates to the electrode surface, where a redox (electron transfer) reaction takes place.
- ③ The resulting current from the electron transfer is measured. (The current is proportional to the amount of substance that reacts.)



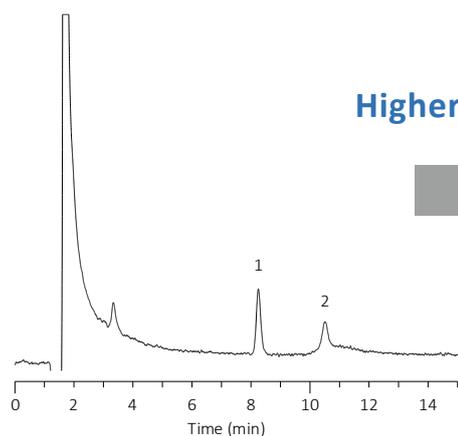
Suitable for
quantitative
analysis.

Highly Sensitive and Selective Detector

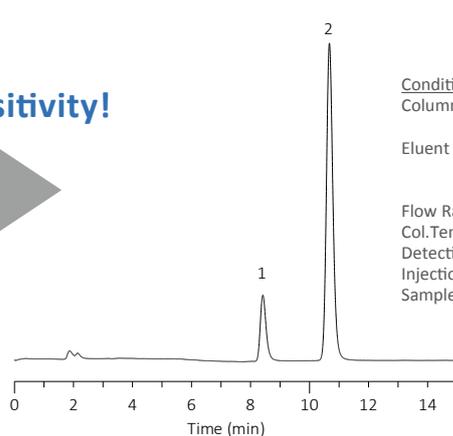
High-Sensitivity Detection

Electrochemical detectors offer 10 to 100 times greater sensitivity than UV detectors.

UV detector



Electrochemical detector



Higher Sensitivity!



Conditions
 Column : Inertsil ODS-3
 (3 μm, 150 × 3.0 mm I.D.)
 Eluent : A) CH₃CN
 B) Phosphate buffer (IPCC-08, pH 2.2)
 A/B = 25/975, w/w
 Flow Rate : 0.4 mL/min
 Col.Temp. : 40 °C
 Detection : ECD (ED743, Diamond)
 Injection Vol. : 10 μL
 Sample : 1. Cysteine
 2. Cystine

Flexible Electrode Selection for a Wide Range of Compounds

You can select the optimal working electrode based on the target compound.

Diamond Electrode

Glassy carbon electrodes may also be used for certain compounds

Phenols

Chlorophenols
 Phenolic acids
 Catechins
 Bisphenols
 Estradiol, etc.

Catecholamines and Related Substances

Noradrenaline (norepinephrine)
 Adrenaline (epinephrine)
 Dopamine
 Serotonin, etc.

Vitamins

Ascorbic acid
 Biotin, etc.

Amino Acids and Peptides

Tyrosine Cystine
 Methionine GSH
 Tryptophan GSSG
 Cysteine, etc.

Gold Electrode

Sugars and Sugar Alcohols

Glucose Xylitol
 Fructose Sorbitol
 Sucrose etc.
 Lactose

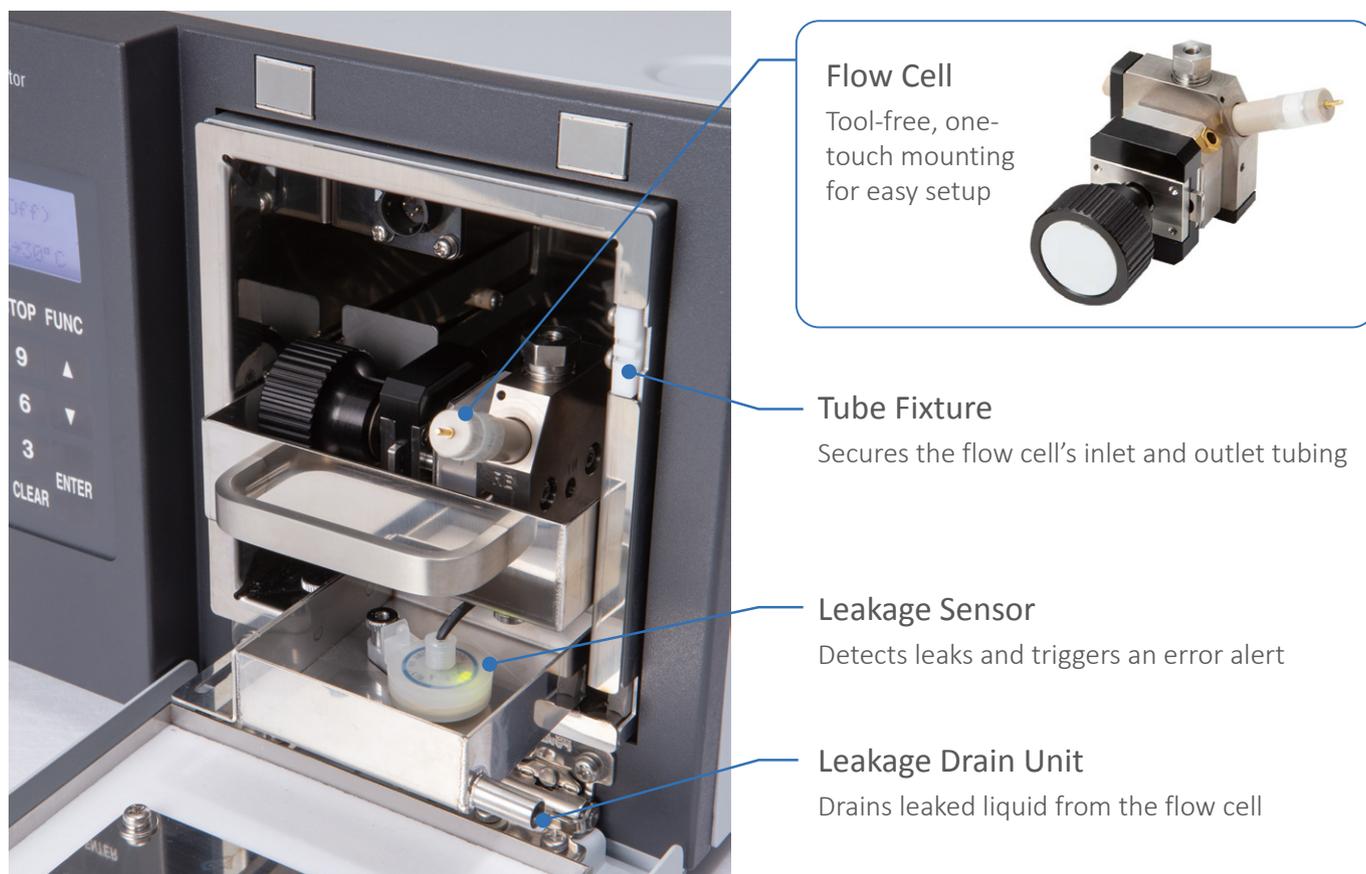
Platinum Electrode

Hydrogen Peroxide, etc.

Silver Electrode

Iodine, etc.

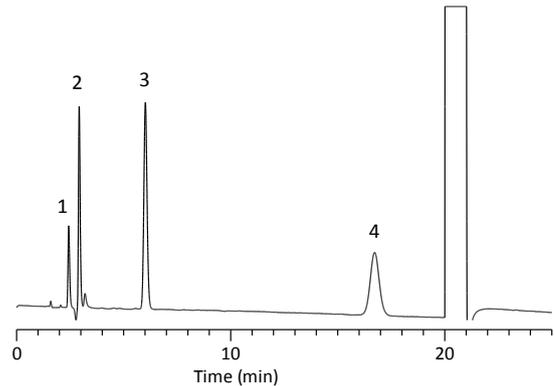
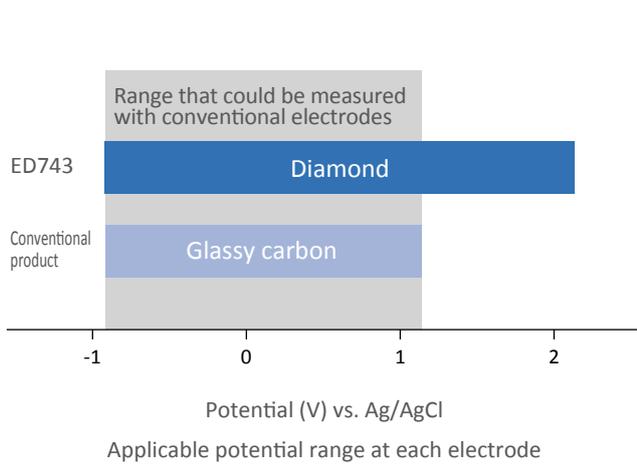
Configuration



Features of Diamond Electrodes

● Expanded Range of Detectable Compounds

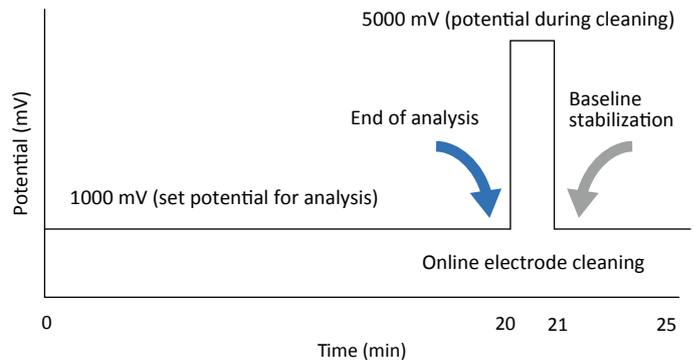
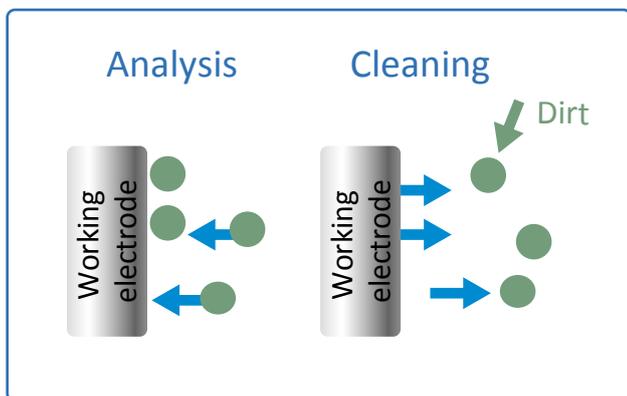
The diamond electrode allows for a broader potential window compared to conventional electrodes, enabling the detection of compounds with high redox potential, such as disulfides (e.g., oxidized glutathione).



Conditions
 Column : InertSustain AQ-C18 (5 μ m, 150 \times 4.6 mm I.D.)
 Eluent : A) CH₃CN
 B) Phosphate buffer (IPCC-06, pH 2.2)
 A/B = 25/975, w/w
 Flow Rate : 1.0 mL/min
 Col.Temp. : 40 $^{\circ}$ C
 Detection : ECD (ED743, Diamond, 1800 mV)
 Injection Vol. : 10 μ L
 Sample : 1. Cystine 3. Glutathione, Reduced Form (GSH)
 2. Cysteine 4. Glutathione, Oxidized Form (GSSG)

● Built-In Electrode Cleaning

By applying a high cleaning potential to the diamond electrode, surface contaminants are removed automatically. This eliminates the need for manual operations like removing the electrode from the flow cell or polishing, and ensures high data reproducibility.



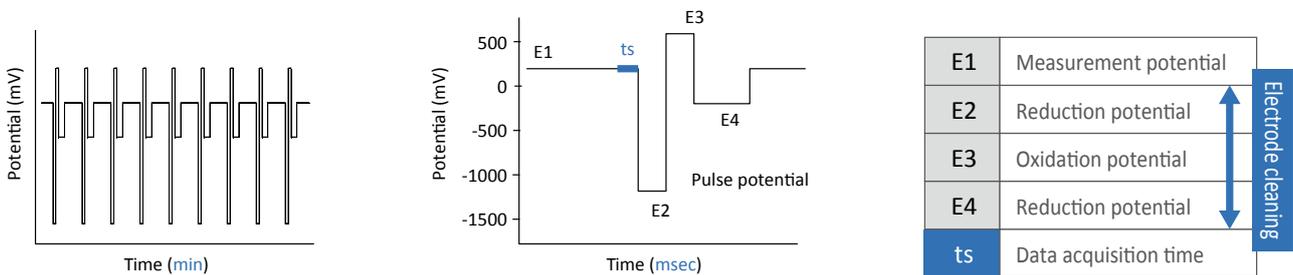
Features of Gold Electrodes

● High-Sensitivity Sugar Analysis

The ED743 supports optional gold electrodes, which enable higher sensitivity detection of sugars compared to RI or fluorescence detectors. Pulsed potentials, as illustrated below, are applied repeatedly to ensure consistent measurement and automatic removal of contaminants from the electrode surface.

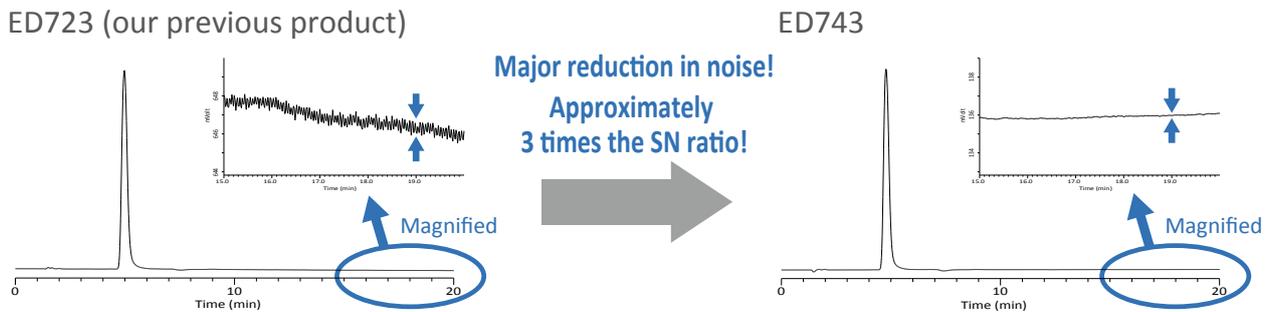
● Pulsed Amperometric Detection (PAD)

A predefined pulsed potential is applied cyclically to enable precise electrochemical detection.



● Improved Sensitivity with Gold Electrodes

Through significant noise reduction efforts, the ED743 achieves approximately 1/8 the noise level of previous models and an S/N about three times higher when using gold electrodes.*



* Based on glucose analysis. Sensitivity may vary depending on the compound and analytical conditions.

Introducing an HPLC column for sugar analysis

The InertSphere Sugar-1 is an anion-exchange column designed for sugar analysis. It is packed with a polymer bonded to quaternary ammonium functional groups.

- Optimized for the analysis of monosaccharides and disaccharides
- Enables high-sensitivity sugar analysis when used with an electrochemical detector
- Compatible with 100% organic solvent cleaning (e.g., methanol)
- Suitable for use with strongly alkaline eluents



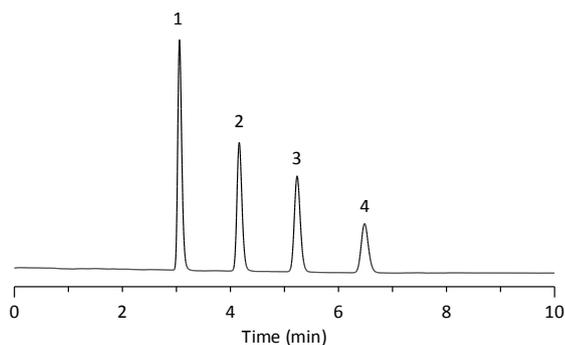
Descriptions		Cat.No.
InertSphere Sugar-1	5 μm 150 × 4.6 mm I.D.	5020-11001

Note: For optimal performance, use with a solvent bottle equipped with a CO₂ trap cartridge.
For details, please contact your local representative.

Applications

●Diamond Electrode: Applications

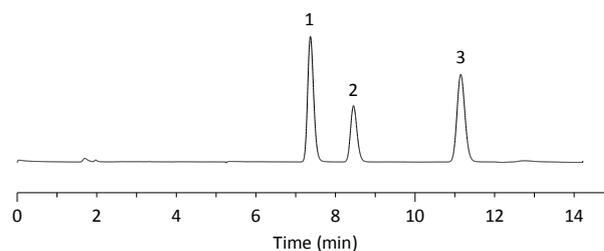
Analysis of Phenols



Conditions

Column : InertSustain AQ-C18 (5 μ m, 150 \times 4.6 mm I.D.)
 Eluent : 0.1% H_3PO_4 in 50% CH_3CN
 Flow Rate : 1.0 mL/min
 Col.Temp. : 30 $^\circ\text{C}$
 Detection : ECD (ED743, Diamond)
 Injection Vol. : 5 μL
 Sample : 1. Phenol
 2. 2-Chlorophenol
 3. 2,4-Dimethylphenol
 4. 2,4-Dichlorophenol

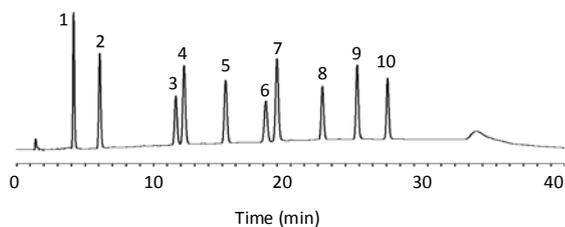
Analysis of Catecholamines



Conditions

Column : Inertsil ODS-4 (5 μ m, 250 \times 3.0 mm I.D.)
 Eluent : A) Acetate-citrate buffer
 B) CH_3CN
 A/B = 100/16, v/v
 Flow Rate : 0.5 mL/min
 Col.Temp. : 35 $^\circ\text{C}$
 Detection : ECD (ED743, Diamond)
 Injection Vol. : 20 μL
 Sample : 1. Norepinephrine (NE)
 2. Epinephrine (E)
 3. Dopamine (DA)

Analysis of Ten Catechins



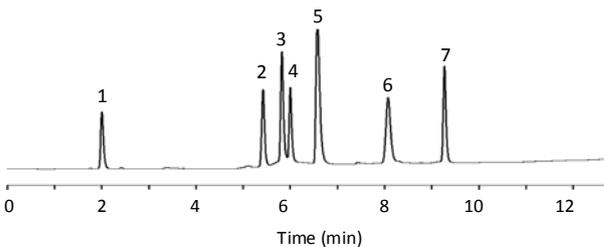
Conditions

Column : InertSustain C18 (5 μ m, 150 \times 4.6 mm I.D.)
 Eluent : A) 0.1% H_3PO_4 in H_2O
 B) $\text{CH}_3\text{CN}/\text{CH}_3\text{OH} = 9/1$, v/v

Time (min)	A (vol%)	B (vol%)
0.0	90	10
15.0	80	20
30.0	60	40
30.1	90	10
40.0	90	10

Flow Rate : 1.0 mL/min
 Col.Temp. : 40 $^\circ\text{C}$
 Detection : ECD (ED743, Diamond)
 Injection Vol. : 10 μL
 Sample : 1. Gallic acid (GA)
 2. Gallocatechin (GC)
 3. Epigallocatechin (EGC)
 4. Catechin (C)
 5. Caffeine
 6. Epigallocatechin gallate (EGCG)
 7. Epicatechin (EC)
 8. Gallocatechin gallate (GCG)
 9. Epicatechin gallate (ECG)
 10. Catechin gallate (CG)
 1 $\mu\text{g}/\text{mL}$

Analysis of Water-Soluble Vitamins



Conditions

Column : Inertsil ODS-3 (5 μ m, 150 \times 4.6 mm I.D.)
 Eluent : A) 0.1% H_3PO_4 + 5 mM sodium 1-pentanesulfonate in H_2O
 B) 0.1% H_3PO_4 + 5 mM sodium 1-pentanesulfonate in
 ($\text{H}_2\text{O}/\text{CH}_3\text{CN} = 50/50$, v/v)

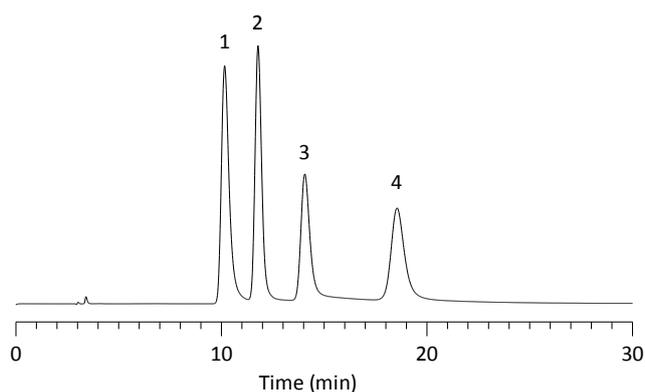
Time (min)	A (vol%)	B (vol%)
0.0	90	10
12.0	80	20

Flow Rate : 1.0 mL/min
 Col.Temp. : 40 $^\circ\text{C}$
 Detection : ECD (ED743, Diamond)
 Injection Vol. : 10 μL
 Sample : 1. L-Ascorbic acid
 2. Pyridoxal
 3. Pyridoxamine
 4. Pyridoxine
 5. Thiamine
 6. Cyanocobalamin
 7. Biotin
 1 $\mu\text{g}/\text{mL}$

Applications

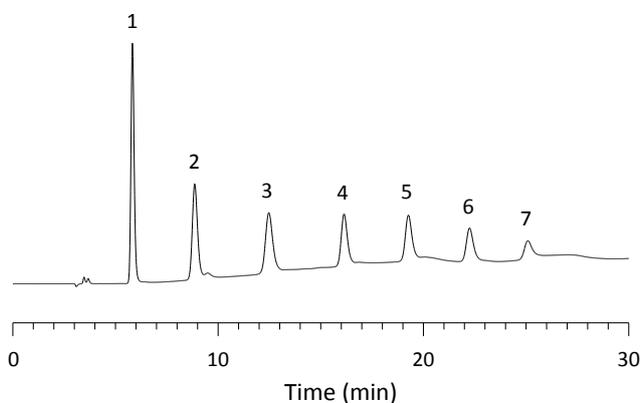
●Gold Electrodes

Analysis of Saccharides



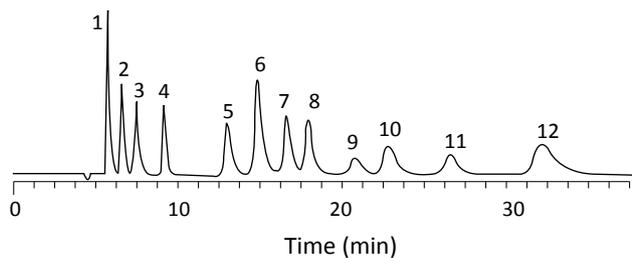
Conditions	
Column	: InertSphere Sugar-1 (5 µm, 150 × 4.6 mm I.D.)
Eluent	: 100 mmol/L NaOH in H ₂ O
Flow Rate	: 0.5 mL/min
Col.Temp.	: 30 °C
Detection	: ECD (ED743, Gold)
Injection Vol.	: 10 µL
Sample	: 1. Fucose 2. Glucose 3. Fructose 4. Lactose

Analysis of Maltooligosaccharides



Conditions	
Column	: InertSphere Sugar-1 (5 µm, 150 × 4.6 mm I.D.)
Eluent	: A) 50 mmol/L NaOH in H ₂ O B) (50 mmol/L NaOH + 400 mmol/L CH ₃ COONa) in H ₂ O A/B = 85/15 - 30 min - 50/50, v/v
Flow Rate	: 0.5 mL/min
Col.Temp.	: 30 °C
Detection	: ECD (ED743, Gold)
Injection Vol.	: 10 µL
Sample	: 1. Glucose 2. Maltose 3. Maltotriose 4. Maltotetraose 5. Maltopentaose 6. Maltohexaose 7. Maltoheptaose

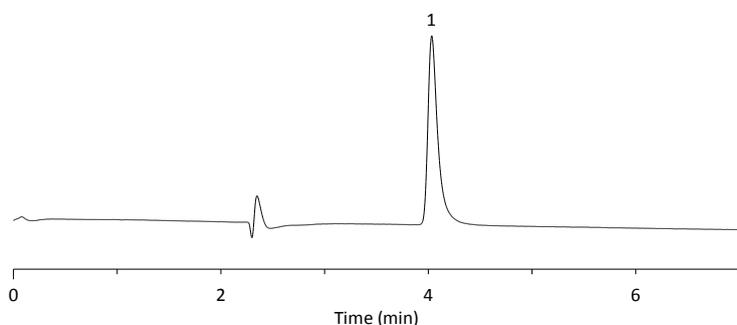
Analysis of Twelve Sugar-Related Compounds



Conditions	
Column	: InertSphere Sugar-1 (5 µm, 150 × 4.6 mm I.D.)
Eluent	: 20 mM NaOH + 8 mM CH ₃ COONa in H ₂ O
Flow Rate	: 0.3 mL/min
Col.Temp.	: 25 °C
Detection	: ECD (ED743, Gold)
Injection Vol.	: 20 µL
Sample	: 1. Inositol 2. Arabitol 3. Mannitol 4. Ethanol 5. Fucose 6. Galactosamine 7. Galactose 8. Glucose 9. Sorbose 10. Lactose 11. Threose 12. Talose 5 mg/L each

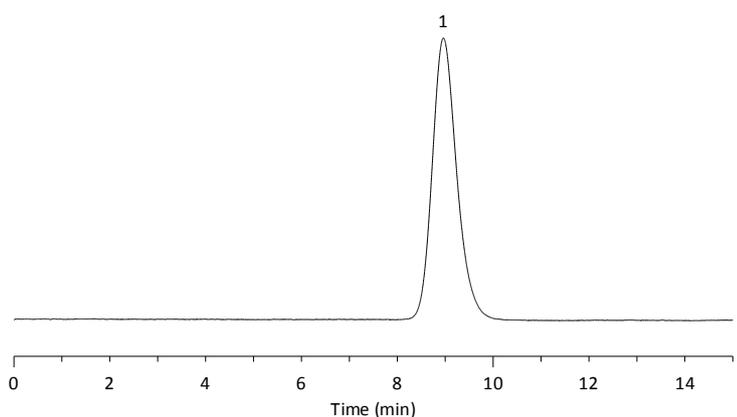
Applications

●Platinum Electrode: Analysis of Hydrogen Peroxide



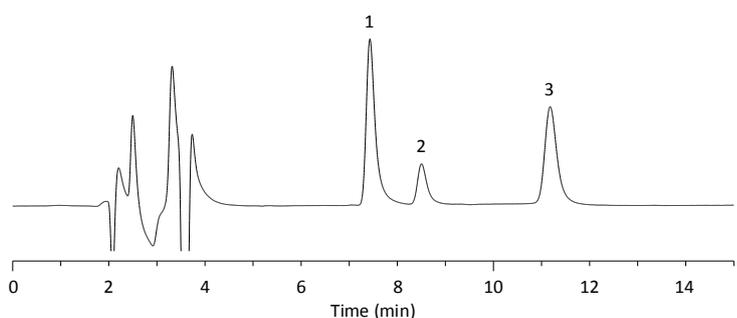
Conditions:
Column : Inertsil CX (5 μ m, 250 \times 4.6 mm I.D.)
Eluent : 10 mmol/L Na₂SO₄
Flow Rate : 0.8 mL/min
Col.Temp. : 30 °C
Detection : ECD (ED743, Platinum)
Injection Vol. : 10 μ L
Sample : 1. Hydrogen peroxide

●Silver Electrode: Analysis of Sodium Iodide



Conditions:
Column : Shodex IC I-524A (12 μ m, 100 \times 4.6 mm I.D.)
Eluent : 100 mmol/L NaH₂PO₄ + 5 mmol/L Ethylenediamine (pH 5.9)
Flow Rate : 1.5 mL/min
Col.Temp. : 40 °C
Detection : ECD (ED743, Silver)
Injection Vol. : 5 μ L
Sample : 1. Sodium iodide

●Glassy Carbon Electrode: Analysis of Catecholamines



Conditions:
Column : Inertsil ODS-4 (5 μ m, 250 \times 3.0 mm I.D.)
Eluent : A) Acetate-citrate buffer
 B) CH₃CN
 A/B=100/16, v/v
Flow Rate : 0.5 mL/min
Col.Temp. : 35 °C
Detection : ECD (ED743, Glassy Carbon)
Injection Vol. : 20 μ L
Sample : 1. Norepinephrine (NE)
 2. Epinephrine (E)
 3. Dopamine (DA)

Specifications and Product Line

Specifications

Measurement Method	Amperometric, Pulsed Amperometric
Working Electrode Option	Diamond, Gold, Glassy Carbon, Platinum, Silver (to be selected at time of purchase)
Reference Electrode	Silver/Silver Chloride
Auxiliary Electrode	Titanium
Flow Cell Pressure Resistance	1 MPa
Potential Setting Range	±5 V (in 10 mV increments)
Measurement Range	10, 100, 1000 nA, 10, 100, 1000 µA/V
Response Time Options	0.1, 0.5, 1.0, 3.0, 6.0, 10.0 seconds
Polarity Switching	Supported
Temperature Control Range	20–45°C
Time Program Function	Up to 30 steps per method, with storage for 10 methods (in flash memory)
Input Signals	AUTO ZERO, START, STOP
Output Signals	Analog (1 V, 10 mV), Digital (1 V, 10 mV), EVENT, ERROR, READY
Dimensions	Main Unit: 260 (W) × 420 (D) × 196 (H) mm Constant Temperature Unit: 100 (W) × 300 (D) × 113 (H) mm
Weight	Approx. 10 kg
Operating Temperature	4–35°C
Operating Humidity	30–80%
Power Supply	AC 100–240 V, 50/60 Hz, 150 VA
Interface	USB

Ordering Information

Product Variant	Cat.No.
ED743 with Diamond Electrode	6001-74310
ED743 with Gold Electrode	6001-74311
ED743 with Glassy Carbon Electrode	6001-74312
ED743 with Silver Electrode	6001-74313
ED743 with Platinum Electrode	6001-74314

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