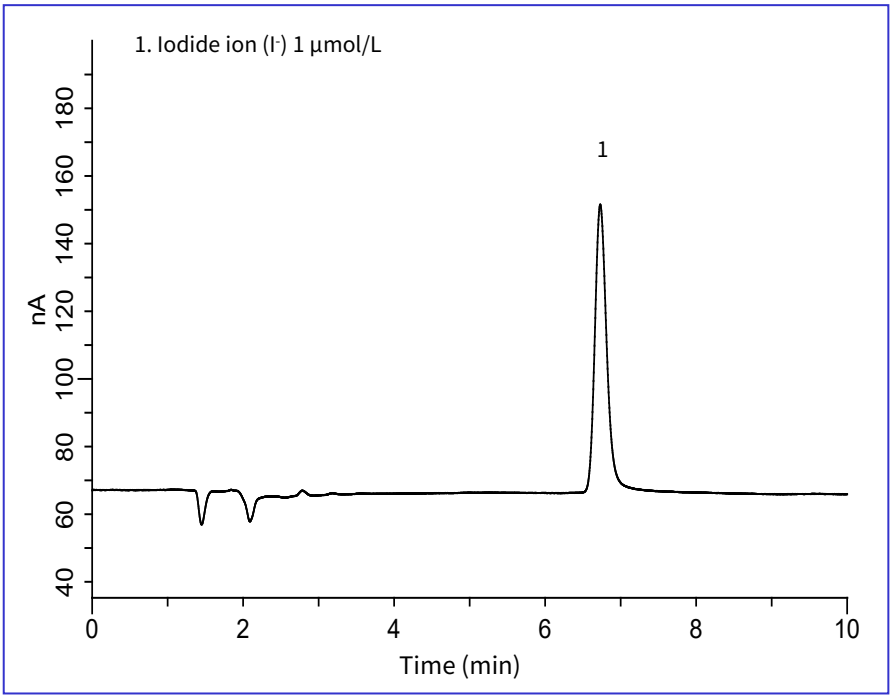
Analysis of Iodide Ions in Seawater by HPLC with ECD

Analysis of iodide ions typically requires separation by ion chromatography followed by detection and quantification using an electrochemical detector (ECD) with a silver electrode, or an inductively coupled plasma mass spectrometer (ICP-MS). However, when using a typical ECD, the silver electrode requires periodic polishing. Both ion chromatography and ICP-MS have the disadvantage of high equipment cost. In this report, an analytical method that combines reversed-phase HPLC and an electrochemical detector with a diamond electrode is shown to be a more convenient method. For separation, iodide ions are successfully retained on an ODS column using a mobile phase with an ion pair reagent. For detection, an electrochemical detector with diamond electrode (that does not require polishing and needs little maintenance) was used. Using this method, it is possible to detect and quantify the iodide ion concentration in seawater.

(C. Aoyama)

Example: Measurement of standard

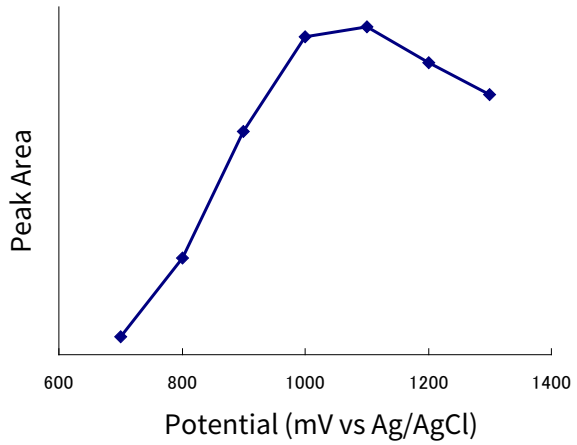


HPLC conditions

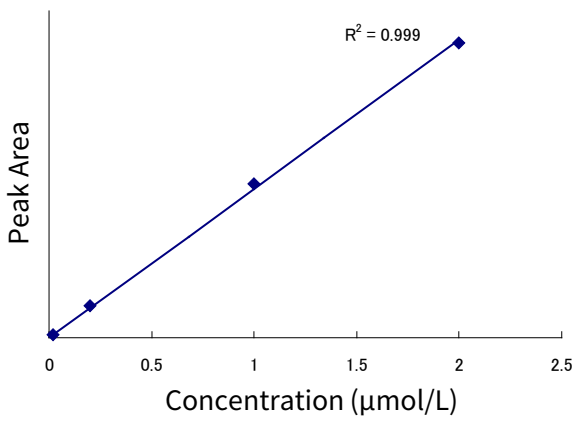
Column	: Inertsil ODS-4 (5 µm, 150 x 3.0 mm I.D.)
Eluent	: A) Phosphate buffer * B) CH_3CN A/B = 65/35, v/v (Mixed by a gradient mixer)
Flow rate	: 0.4 mL/min
Column temperature	: 35 ˚C
Detected	: ECD 1000 mV vs. Ag/AgCl
Injection volume	: 10 µL

* Phosphate buffer:
1.56 g disodium dihydrogen phosphate (dihydrate) 3.58 g Disodium hydrogen phosphate (12 hydrate) and 0.32 g chloride Hexadecyltrimethylammonium were dissolved in 1 L of ultrapure water.

Relationship between potential and peak area



Calibration curve



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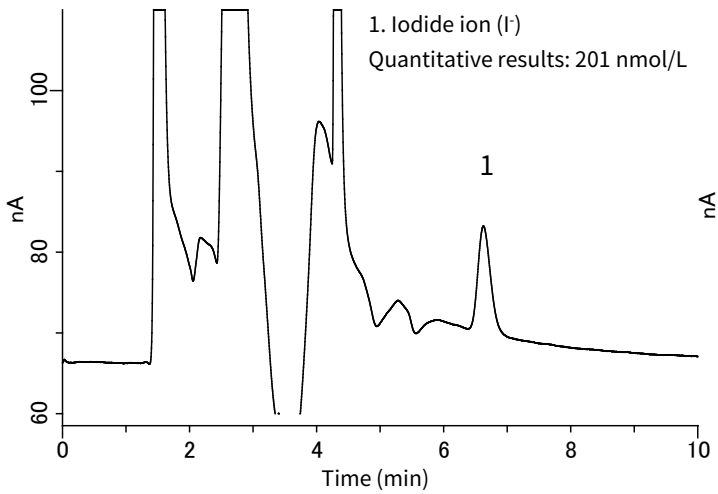
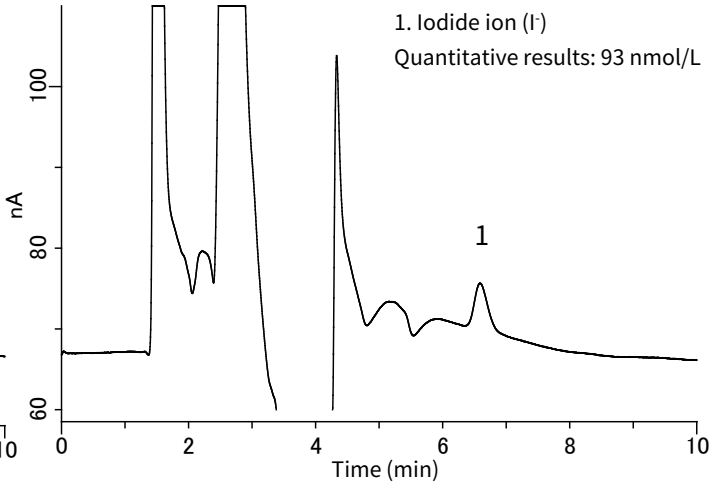
<Example Chromatograms of sea water analysis>

The seawater was filtered through a 0.45 µm membrane filter, which served as a sample solution.

Seawater sampled at an urban fishing port



Seawater sampled at a tourist beach



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