

# GL Sciences' Initiatives in Supporting Research on Atmospheric PFAS Analysis

— Providing Analytical Tools and Products from a Manufacturer's Perspective —

# Company Profile

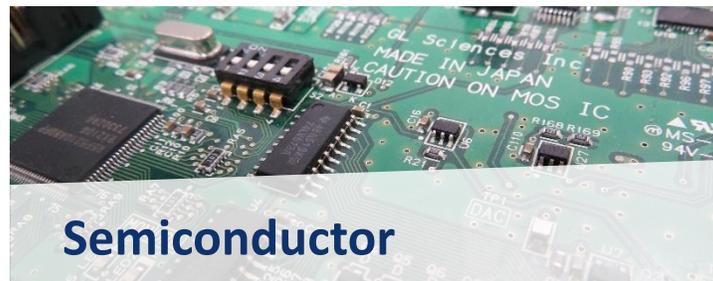
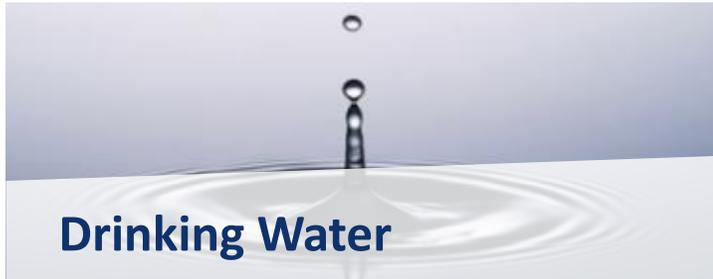
Foundation : February 1, 1968  
Head Office : Tokyo, Japan  
President : Yoshihiro Nagami  
Capital : JPY 350,000,000  
Employees : 469

## Main Business

Gas Chromatography Columns, Liquid Chromatography Columns, SPE Columns, Sample Preparation Equipment, Auto Sample Prep Equipment



# Our business area



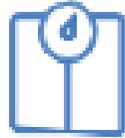
# About PFAS (Per- and Polyfluoroalkyl Substances)

- Short for Per- and polyfluoroalkyl substances.
- A group of man-made chemicals including [PFOA](#), [PFOS](#), [GenX](#) and etc.
- They don't break down and they can accumulate over time.

[www.epa.gov/pfas](http://www.epa.gov/pfas)



**Cancer Effects**  
Increased risk of some cancers, including prostate, kidney, and testicular cancers.



**Weight Effects**  
Increased cholesterol levels and/or risk of obesity.



**Immune Effects**  
Reduced ability of the body's immune system to fight infections.



**Developmental Effects**  
Low birth weight, accelerated puberty, bone variations, or behavioral changes.



**Reproductive Effects**  
Decreased fertility or increased high blood pressure in pregnant women.

# FM4, Air Sampler for PFAS



## Comprehensive Sampling Device

Both a particulate substance and a gaseous substance can be simultaneously collected using one compact sampler. Because it is possible to evaluate the collection amount for each material, comprehensive PFAS evaluation is possible.

## Capable of Collecting Gaseous PFAS (FTOH, etc.)

The collection of gaseous PFAS in the air, which are difficult to collect, is now possible using the newly activated carbon desorption material.

## Excellent Recovery Rate

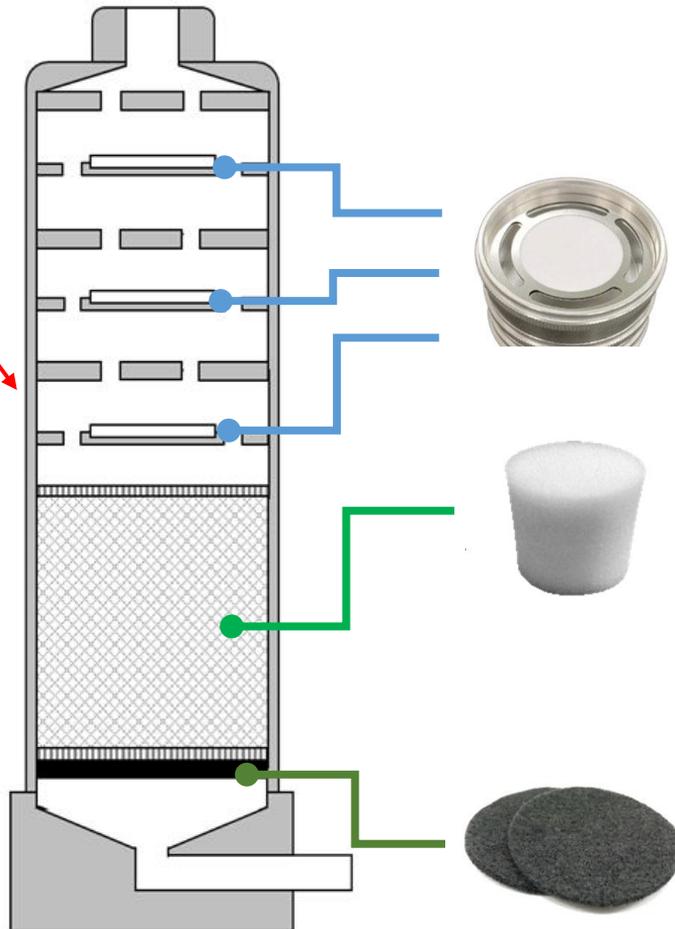
We achieved recovery rates for various PFAS.

## Compact and Portable

A lightweight and compact air sampler that is easy to carry and does not have a large footprint.

\* This product was developed in a joint effort by National Institute of Advanced Industrial Science and Technology (AIST) and FUTAMURA CHEMICAL CO.,LTD.

# Product composition and collection target



**Quartz Fiber Filter (QFF) × 3**

Stage 1: > 10  $\mu\text{m}$

Stage 2: 2.5 - 10  $\mu\text{m}$

Stage 3: 1.0 - 2.5  $\mu\text{m}$

**Polyurethane Foam (PUF)**

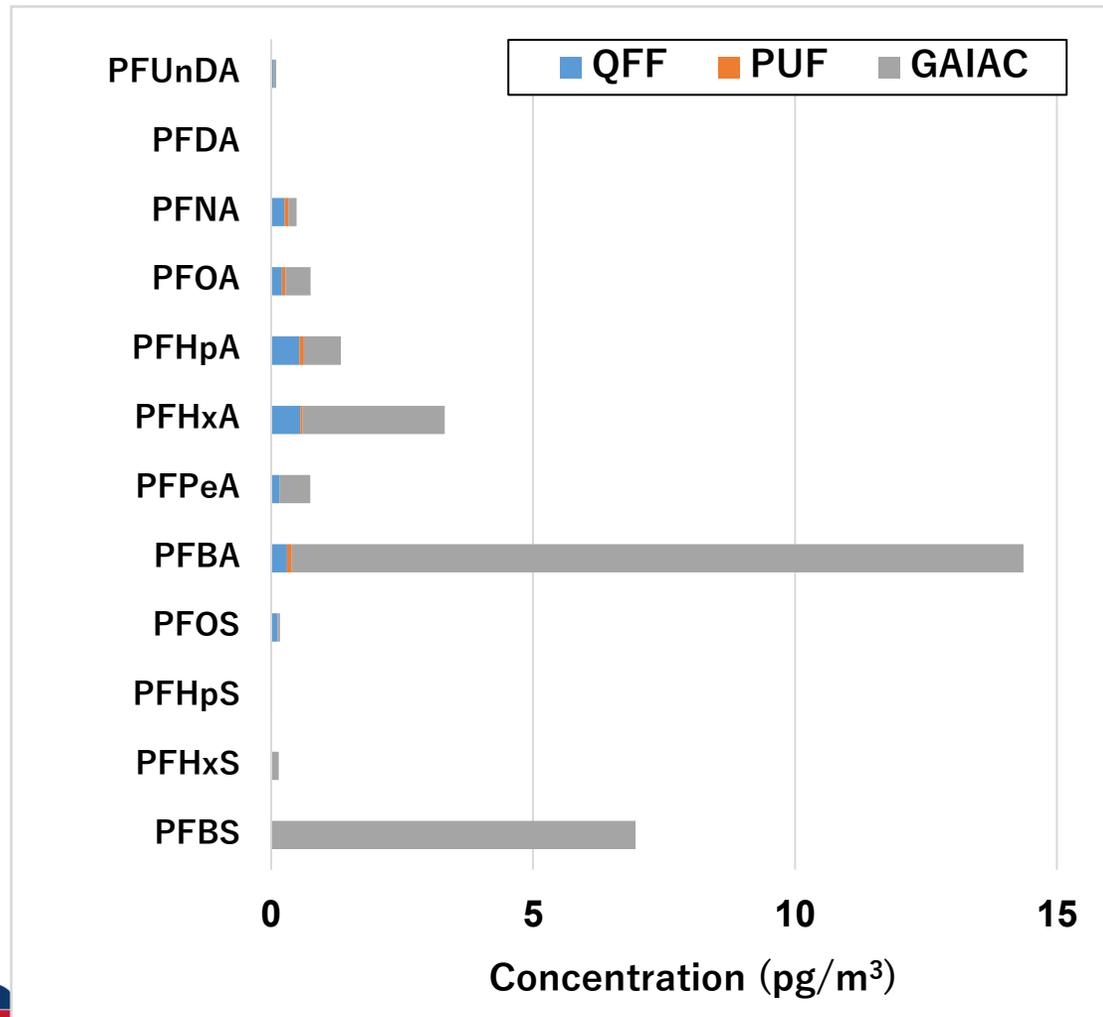
**Activated Carbon Fiber Disk (GAIAC) × 2**

Particle

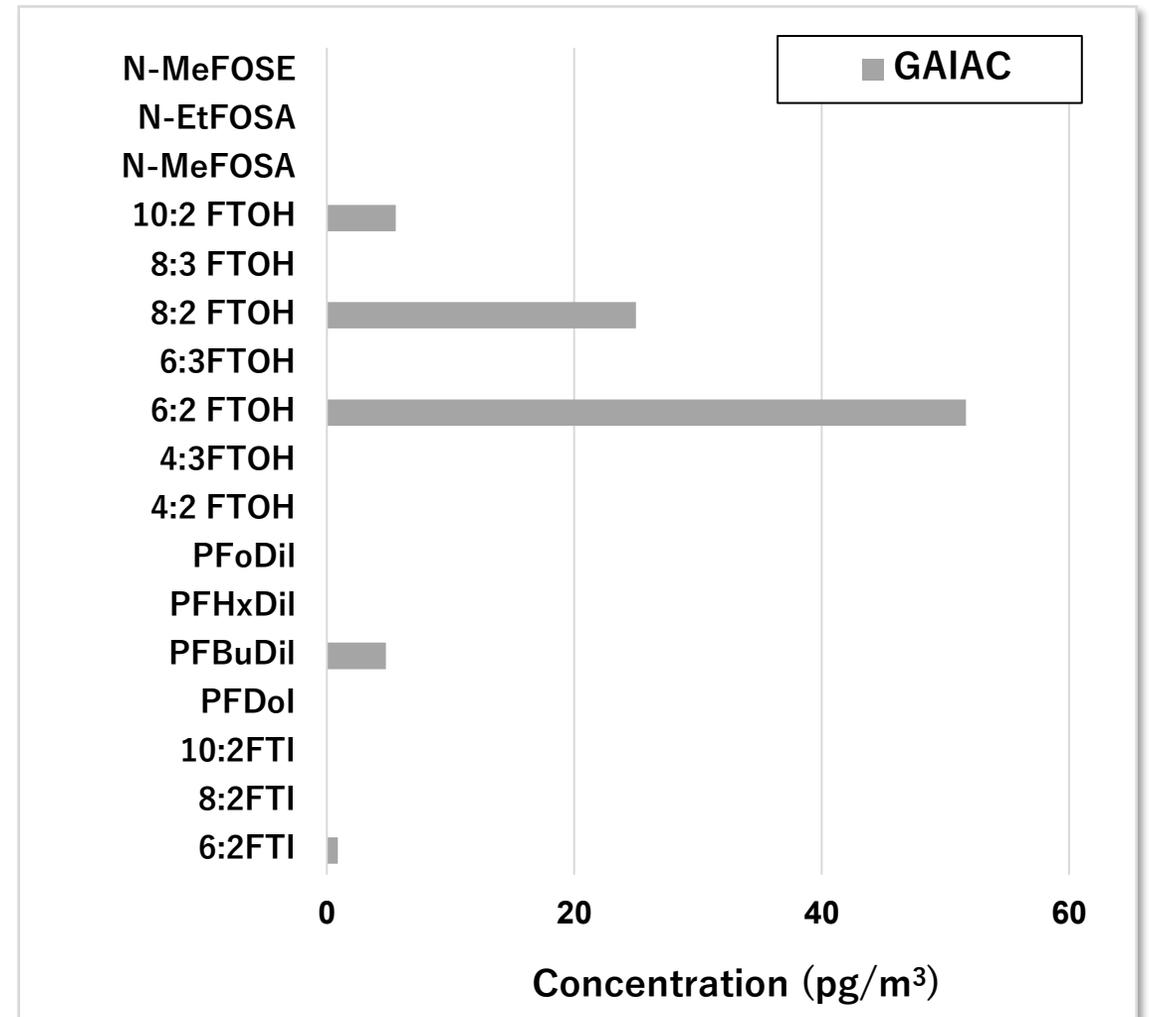
Gas

# Air Measurement Example

## Ionic PFAS



## Neutral PFAS



# Reference

1. Yamazaki E.; Taniyasu S.; Wang X.; Yamashita N. Per- and polyfluoroalkyl substances in surface water, gas, and particle in open ocean and coastal environment. *Chemosphere*. 2021, 272, 129869.
2. Yu, N.; Wen, H.; Wang, X.; Yamazaki, E.; Taniyasu, S.; Yamashita, N.; Yu, H.; Wei S. Non-target discovery of per- and polyfluoroalkyl substances in atmospheric particulate matter and gaseous phase using cryogenic air sampler. *Environ. Sci. Technol.* 2020, 54 , 3103–3113.
3. Lin H.; Taniyasu S.; Yamazaki E.; Wei S.; Wang X.; Gai N.; Kim J.; Eun H.; Lam P.; Yamashita N. Per- and Polyfluoroalkyl Substances in the Air Particles of Asia: Levels, Seasonality, and Size-dependent Distribution. *Environ. Sci. Technol.* 2020, 54 , 14182–141191.
4. Takemine S.; Tsurukawa M.; Matsumura C.; Yoshida M.; Yonekubo J.; Oita A.; Okada Y.; Suzuki M.; Eiho J.; Nakano T.; Ezaki T.; Perfluorinated compounds in atmosphere of Hyogo Prefecture, Japan. *Organohalogen Compounds*. 2010, 72, 1800–1803.
5. Wu R.; Lin H.; Yamazaki E.; Taniyasu S.; Söregård M.; Ahrens L.; Lam P.; Eun H.; Yamashita N. Simultaneous Analysis of neutral and ionizable per- and poly fluoroalkyl substances in air. *Chemosphere*. 2021, 280, 130607.
6. Steve Suh, David Kennedy, Reika Takahara, Manabu Takayanagi, Hiroshi Hayashida, Zhonghua Shen. A Multiphase Sampling and Analytical Approach for Investigating Airborne PFAS Transmission. *LCGC Supplements. Hot Topics in PFAS*. Volume 41. Issue s9, Pages: 18–25.

# PFAS Testing Solutions Guide



[PFAS Testing Solution Guide \(meclib.jp\)](http://meclib.jp)

- Applications
  - PFAS in Air using LC-MS/MS and GC-MS/MS
  - PFAS in Water using LC-MS/MS
- Sample Preparation Products
  - Automated SPE Instrument
  - Air Sampler
  - SPE Columns
- Chromatography Consumables
  - LC Column
  - GC Column
  - Vial

# Air Quality Testing Product

– VOC and Aldehydes –



## Sampling Pump

- SP209, a sampling pump
- Accuracy flow
- Large Flow Rate Range is Covered



## DNP-H SPE Cartridge

- InertSep DNP-H is SPE cartridge for collecting aldehydes and ketones



## Sampling Bags

- Sampling bags suitable for VOC analysis



## TD Tube

- Thermal Desorption Sampling Tubes



[www.glsciences.com](http://www.glsciences.com)