

ARIDUS II™

Desolvating Nebulizer System for ICP-MS

The CETAC Aridus II™ Desolvating Nebulizer System is a specialized sample introduction accessory for Inductively Coupled Plasma Mass Spectrometry (ICP-MS). The Aridus II™ can enhance analyte sensitivity up to 10+ times and can greatly reduce solvent-based interferences such as oxides and hydrides.



INTRODUCTION

The Aridus II™ couples the Aspire™ low-flow PFA nebulizer and a heated PFA spray chamber with a PTFE membrane desolvator unit. This combination provides enhanced analyte sensitivity while reducing solvent based interferences, such as oxides and hydrides. The Aridus II™ is particularly advantageous for small and highly corrosive samples (e.g. HF) such as those generated in earth sciences and the semiconductor industry.

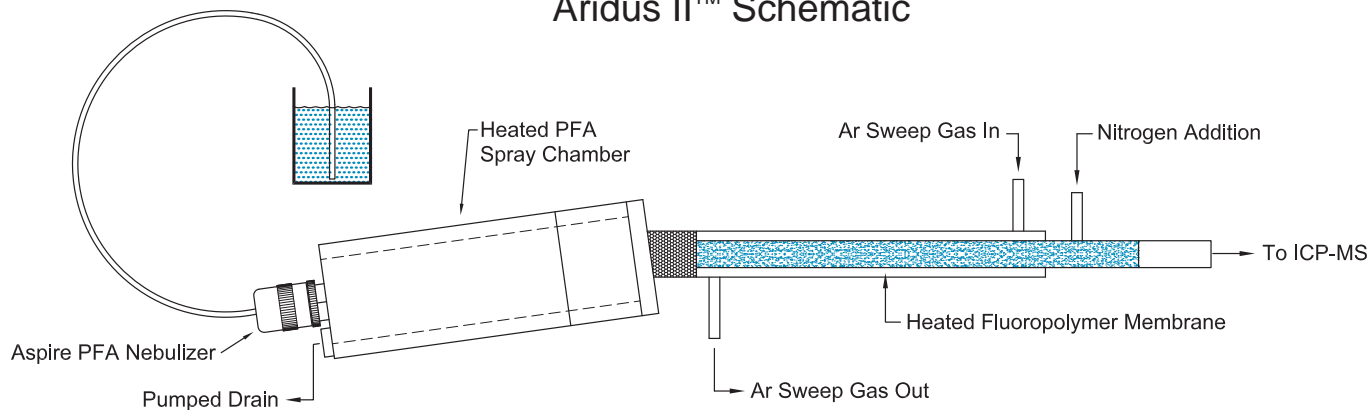
The Aridus II™ can be easily interfaced with all current types of ICP-MS instruments, including quadrupole, high-resolution (HR), multi-collector (MC) and time of flight (TOF).

The sample path (nebulizer, spray chamber and membrane), are all made of inert fluoropolymers which are resistant to all acids including hydrofluoric acid (HF). Sample-solvent vapors pass through the inert membrane to vent, providing very low oxides (%CeO/Ce is usually 0.05% or less).

KEY FEATURES

- Sensitivity enhanced by a factor of 4 to 10+ times
- Low volume sample uptake rates of 50, 100 or 200 $\mu\text{L}/\text{min}$
- Unique, tunable Aspire™ PFA Nebulizer with replaceable capillary
- Heated PFA spray chamber for high sample transport efficiency
- Both nebulizer and spray chamber are behind a secured door to alleviate electrostatic effects
- Patented PTFE membrane desolvator for lowest oxide and hydride levels
- Built-in gas flow controllers for both argon sweep gas and N_2 addition gas
- Built-in spray chamber drain pump with acid-resistant PVDF parts
- Dedicated, adjustable temperature controllers for both spray chamber and membrane desolvator
- Modular membrane desolvator for easy cleaning and/or replacement

Aridus II™ Schematic



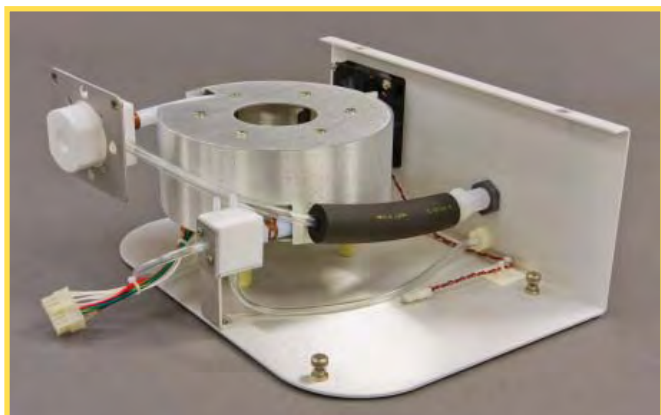
PRINCIPLE OF OPERATION

Sample solution is introduced to the Aridus II™ by a self-aspirating Aspire™ PFA Nebulizer. The nebulizer aerosol is sprayed into a heated (up to 110 °C) PFA spray chamber to maintain the sample in a vapor phase. The sample vapor then enters a heated PTFE membrane desolvator module.

A countercurrent flow of argon sweep gas is added to remove solvent vapors that permeate the porous wall of the membrane. Nonvolatile sample components do not pass through the membrane wall and continue to the ICP-MS instrument.

MEMBRANE DESOLVATOR MODULE

The Aridus II™ is equipped with a modular membrane desolvator (shown below). The module is an integral part of the Aridus II™ chassis and can be quickly removed or replaced. Once removed from the Aridus II™, the membrane desolvator can be conveniently cleaned. A specialized rinse kit is provided to introduce an appropriate cleaning solution such as dilute nitric acid.



Aridus II™ Membrane Desolvator Module

Aridus II™ Specifications:

Nebulizer: CETAC Aspire™ PFA
50,100 or 200 µL/min uptake

PTFE Desolvating Membrane:

Argon Sweep Gas: 0 - 8.0 L/min

Nitrogen Gas: 0 - 50 mL/min

Membrane Oven Temperature: 160 °C

Spray Chamber: PFA with pumped drain

Temperature: 110 °C

Voltage: 120 VAC +/- 10%, 50/60 Hz, 6A

220 VAC +/- 10%, 50/60 Hz, 3A

Dimensions:

Height: 24.8 cm (9¾")

Width: 33.6 cm (13¼")

Depth: 55.9 cm (22")

Weight: 10.5 kg (23.1 lbs.)

Warranty: 12 month limited

ASX-112FR

Micro Autosampler

The ASX-112FR (Flowing Rinse) Micro Autosampler is designed specifically for use with the Aridus II™. This compact autosampler features a protective cover and dual flowing rinse stations to ensure sample integrity from the first to the last sample. Ideal for the analysis of small volume samples in an ultra clean environment.



Compact

Space Saving Design: Modular design allows placement on top of the Aridus II™ cover for maximum conservation of valuable laboratory bench space. This arrangement also minimizes sample path length using Aspire™ PFA nebulizer with integrated sample probe.

High Purity

Dual Flowing Rinse: The ASX-112FR utilizes dual, continuous flow rinse stations, operable in gas-displacement or peristaltic pump mode, minimizing sample contamination and carryover.

Contamination Resistant: All sample vials, racks, and trays are constructed of metal-free, acid-resistant, high-purity polymeric materials. In addition, the ASX-112FR has an integrated enclosure hood to minimize sample contamination.

Flexible

Adaptable: The ASX-112FR accommodates rack configurations allowing operation with sample volumes as low as 200 µL, and up to 15 mL.

Convenient

Easy Access: Sample and racks may easily be accessed (during operation, if desired) through a hinged door, or by removing the entire anti-contamination hood.

Technical Specifications:

Standards Tray Size: 5 positions (20 mL vial), 9 positions (4 mL vial)

Sample Rack Configurations: CETAC racks – 24, 48, and 96 positions; BelArt half racks – 30 and 42 positions

Computer/Hardware Interfaces: USB, RS-232, IEEE-488 (optional)

Power Requirements: 100 - 240 VAC +/- 10%, 50/60 Hz

Dimensions:

Height: 42.9 cm (16.9")

Width: 33.4 cm (13.1")

Depth: 50.8 cm (20")

Weight: 14.1 kg (31.0 lbs) with enclosure hood

Warranty: 2 year limited .

QUICKWASH ACCESSORY

Fast Washout Accessory for the Aridus II™

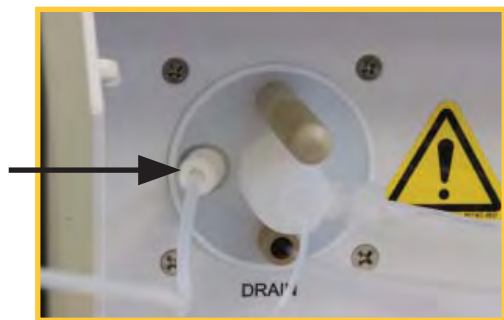
The CETAC QuickWash Accessory for the Aridus II™ rapidly washes the inner wall of the PFA spray chamber, providing greatly reduced washout times for higher concentration analytes. The QuickWash can be operated in a manual or an automated mode, the latter in conjunction with the ASX-112FR Autosampler.



The CETAC Aridus II™ Desolvating Nebulizer System is a popular accessory for signal enhancement with ICP-MS. The introduction of higher (> 100 mg/L) analyte concentrations is common with multicollector ICP-MS, a specialized instrument used for isotope ratio measurements.

While the Aridus II™ can greatly improve ICP-MS signal, the prolonged introduction of higher concentration samples can cause analyte and matrix buildup on the inner wall of the heated PFA spray chamber. This buildup can cause signal spikes and longer sample washout.

The CETAC QuickWash Accessory is used during the rinse cycle of the Aridus II™ to rapidly wash the inside of the spray chamber, greatly reducing washout times. The QuickWash controls a second pneumatic nebulizer that is positioned in the side-front of the spray chamber and generates a tangential aerosol to efficiently rinse the chamber.



QuickWash Gas-Liquid Line to Spray Chamber

The QuickWash uses a pumped rinse liquid flow (1–2 mL/min using the ICP-MS peristaltic pump) and a high argon gas flow (2 L/min, teed from the Aridus II™ sweep gas supply) for the rinse aerosol generation. The tilted position of the spray chamber prevents liquid from reaching the Aridus II™ membrane desolvator and the on-board peristaltic pump will rapidly remove any liquid in the chamber. Wash times are preset in increments of 10 seconds up to 160 seconds, with a typical time range of 30 to 60 seconds. The QuickWash can be used manually or can be set to start automatically when used with the CETAC ASX-112FR Autosampler. The QuickWash control box can be conveniently mounted on the left or right side of the Aridus II™, depending on the host ICP-MS configuration.

Technical Specifications

Power Requirements: 100 –240 V, 47–63 Hz, 3.3A

Voltage: 24 VDC Power Supply

Argon Gas Flow: 2 L/min (factory setting)

Dimensions:

Height: 14.3 cm (5.6")

Width: 6.7 cm (2.6")

Depth: 27.6 cm (10.9")

Weight: 1.07 kg (2.35 lbs)

Warranty: 12 month limited