



Air Cell Mode of the Agilent 9500 ICP-MS

Simple interference reduction using ambient air



Air cell mode at a glance

- Uses ambient laboratory air as the reaction gas
- Uses oxygen in air for ion-molecule reactions
- Removes moisture and hydrocarbons with an Air cell gas filter
- Reduces doubly charged ion and challenging polyatomic interferences
- Complements AHM in standard multielement methods

Simple and effective interference reduction using ambient air

Interference reduction is essential for accurate ICP-MS analysis across complex sample types. In triple quadrupole ICP-MS, MS/MS operation enables controlled use of collision and reaction cell gases, helping separate analytes from interfering ions before detection.

The Agilent 9500 ICP-MS features a unique Dual-Cell System that can operate in both Advanced Helium Mode and Air cell mode. Air cell mode uses ambient laboratory air as the reaction gas, eliminating the need for external oxygen cylinders, gas cabinets, or related gas infrastructure.

A new approach to interference reduction

Ambient air is made up primarily of nitrogen and oxygen. In Air cell mode, oxygen in the air drives ion-molecule reactions that reduce interferences, while nitrogen mainly supports thermal relaxation of ions. Before air enters the cell, an Air cell gas filter removes reactive contaminants, such as moisture and hydrocarbons, helping prevent uncontrolled reactions and support reliable results.

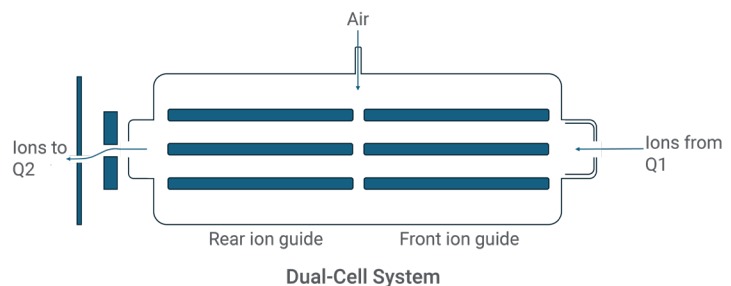


Figure 1. Schematic of the Agilent Dual-Cell System in Air cell mode. The DCS uses ambient air as the reaction gas. Oxygen in air supports interference reduction through ion-molecule reactions, eliminating the need for oxygen cylinders.

Air cell mode complements AHM

Collision cell modes, such as helium mode and AHM, are broadly effective for many polyatomic interferences. However, they are less effective for doubly charged ion interferences and may not resolve every challenging overlap.

Air cell mode complements AHM by using oxygen from ambient air to reduce doubly charged ion interferences and selected polyatomic ion interferences. In Agilent OpenLab ICP-MS software, a standard multitune method can combine AHM and Air cell mode to support efficient interference reduction across sample matrices such as soils, seawater, and foods.

Simple and powerful interference reduction

With the Dual-Cell System operating in Air cell mode, the Agilent 9500 ICP-MS uses ambient laboratory air to reduce challenging interferences without external reaction cell gases. Combined with AHM in standard multitune methods, Air cell mode supports simple, reliable analysis across complex matrices.

Suppressing interferences on arsenic and selenium

Rare earth elements (REEs) commonly found in food and soil samples can form doubly charged ions that interfere with arsenic and selenium. AHM is effective for reducing many polyatomic ion interferences on As and Se, but it is less effective against doubly charged REE interferences.

Air cell mode converts As and Se to oxide product ions, moving them away from REE²⁺ and polyatomic interferences for more reliable measurement.

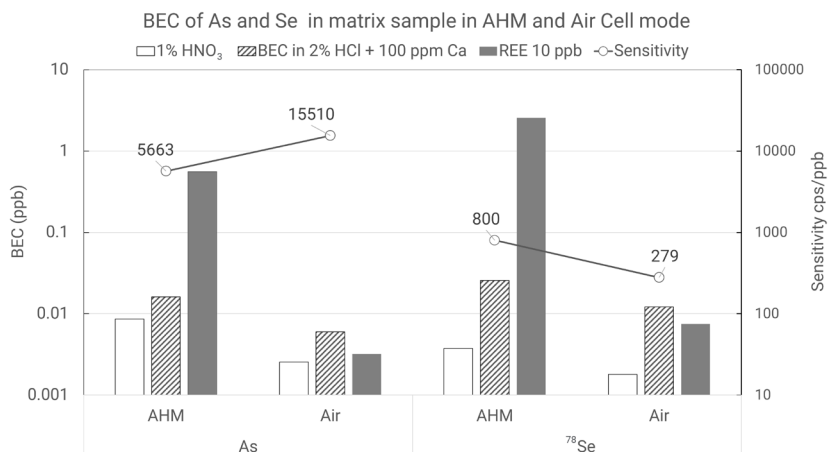


Figure 2. BECs and sensitivity of As and Se in AHM and Air cell mode. Air cell mode shifts As and Se to oxide product ions, reducing REE²⁺ and polyatomic ion interferences.

Sensitive analysis of difficult elements

Sulfur, phosphorus, and silicon are difficult to analyze by ICP-MS because of severe interferences from ions such as O₂⁺, NO⁺, and N₂⁺. AHM reduces these interferences, while Air cell mode enables analysis with lower BECs and detection limits and higher sensitivity.

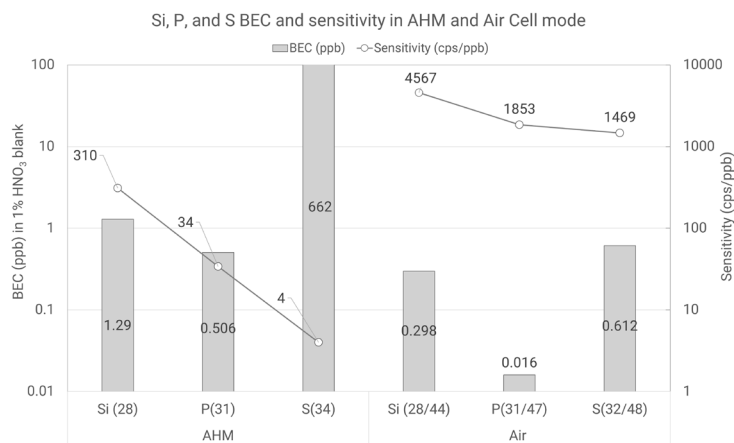


Figure 3. BECs and sensitivity of Si, P, and S in AHM and Air cell mode. Air cell mode enables lower BECs and detection limits with higher sensitivity for difficult-to-measure elements.

Learn more about the Agilent 9500 ICP-MS

www.agilent.com/chem/9500icpqqq

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