

Automatic Sprayer for MALDI Imaging

iMLayer AERO

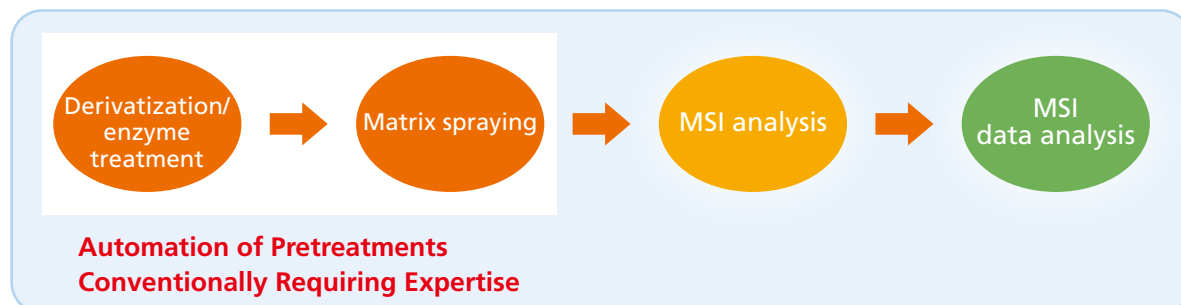


Easily Obtain Images with High Sensitivity and High Spatial Resolution

The iMLayer™ AERO incorporates a sample stage that moves at a controlled rate while maintaining the same distance from the spray nozzle, enabling stable matrix spraying.

Over multiple strokes, the sample becomes laminated with fine matrix crystals, enabling high sensitivity and high spatial resolution.

Workflow



Spray Nozzle

Rinse solution bottle

Reagent bottle

Sample Stage and Spray Nozzle

The newly developed spray nozzle provides a fine spray. The distance between the sample and nozzle can be adjusted between 5 and 10 cm.

Control Software

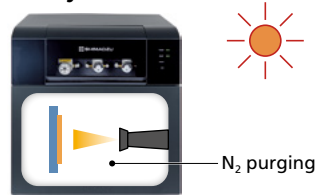
The experiment wizard windows enable ease of use and mistake-free experimental setup. This wizard, in combination with included preset methods, allows users to become proficient in no time.

Imaging with High Reproducibility

● Humidity Control

High humidity makes matrix deposition unstable. The influence of humidity can be reduced by replacing the atmosphere within the spray chamber to dry nitrogen gas before pretreatment.

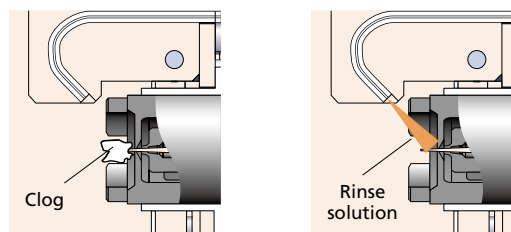
iMLayer AERO



● Clog-Free Reagent Delivery*

If the matrix clogs the nozzle tip, the spray becomes unstable, which can lead to lower reproducibility. The rinsing mechanism allows for clog-free, stable spraying, which enables high reproducibility in MALDI analyses.

* Patent: JP7306180



High Spatial Resolution and High Sensitivity Achieved

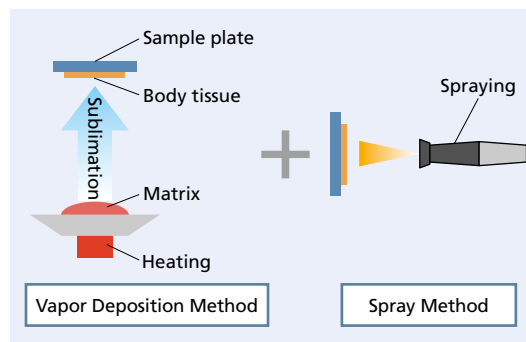
● Excellent Spray Performance

The standard protocol provides sensitivity on par with a hand spray along with improved resolution, homogeneity and reproducibility.

● Two-Step Vapor Deposition

To acquire high spatial resolution (5 to 10 μm) images and increase sensitivity, a two-step vapor deposition method can be implemented in combination with the iMLayer matrix vapor deposition system.* This unique experiment can only be implemented using Shimadzu sample preparation solutions.

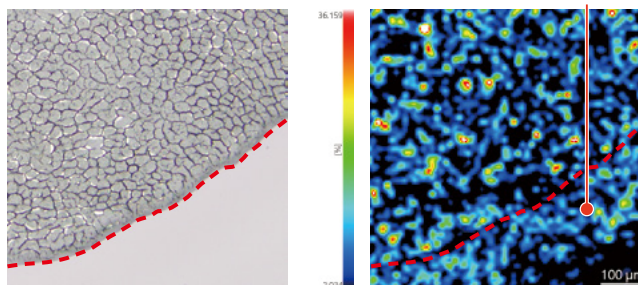
* Patents: JP6153139 and JP6183779



Two-Step Vapor Deposition Allows for Very Fine Images with Minimal Blur

Hand Spray

- Matrix : 9-AA
- Volume used : 200 μL



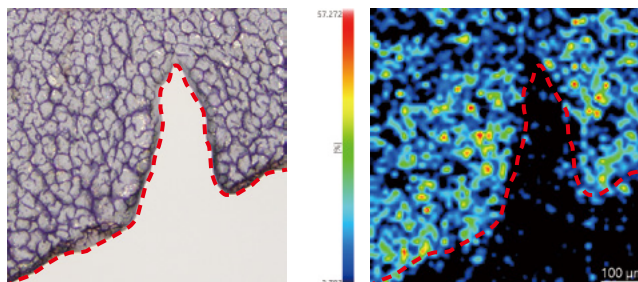
Two-Step Vapor Deposition

Step 1: iMLayer (vapor deposition method)

- Film thickness : 1 μm

Step 2: iMLayer AERO (spray method)

- Solution delivery volume : 120 $\mu\text{L}/\text{min}$
- Stage speed : 70 mm/sec
- Laminating layers : 4



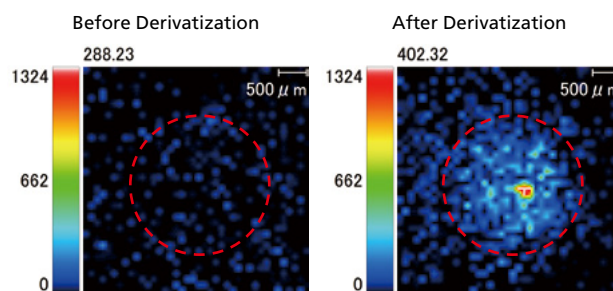
Applicable to Pretreatment Other than Matrix Coatings

• Derivatization Treatment

The system is also compatible with derivatization treatment (Girard's reagent T).

A single iMLayer AERO unit provides extensive MSI pretreatment coverage.

Using derivatization can improve the ionization efficiency of testosterone and other substances that are difficult to ionize.



Sample: 1 μ M spot of testosterone

Derivatization: Girard's reagent T, standing for 120 minutes at room temperature

Matrix: CHCA

Specifications

Applicable Matrix	DHB, 9-AA, CHCA
Compatible Derivatization Reagent	Girard's reagent T
Compatible Enzyme Digestive Reagent	Trypsin
Sample	Glass slide (76 × 26 mm), 1 to 2 slides
Size and Weight	W 400 × D 480 × H 445 mm, 33 kg
Required Power	Single-phase 100 to 240 VAC, 50/60 Hz
Maximum Power Consumption	100 VA
Temperature and Humidity	18 to 28 °C, 40 to 70 %
Nitrogen	Flowrate of 20 L·atm/min; purity of 90 % or higher (not contaminated with flammable or supporting gases)

Note: A control computer for the system is separately required.

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