

Sublimation Purification System for Organic Materials

From basic research to small-scale production



P-100 (Φ 33 glass)



P-400 (Φ 200 glass)

ALES Technology Co., Ltd.

Introduction

Our sublimation purification equipment incorporates feedback from customers based on extensive delivery experience, resulting in continuously improved devices.

Furthermore, we offer a wide range of options to customize the equipment to meet your specific requirements.

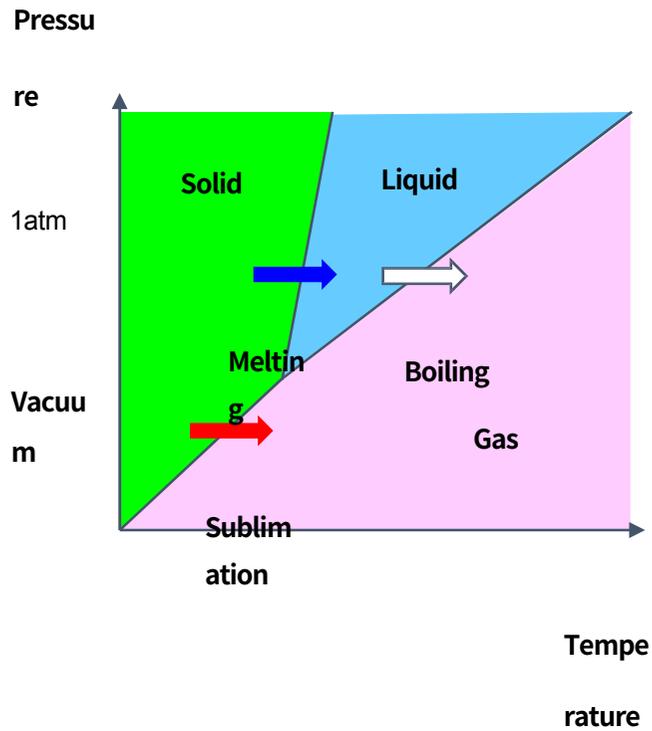
Compared to self-built or custom-made equipment, we confidently provide superior sublimation reproducibility, ease of operation, enhanced safety, and simplified maintenance.

A simplified, low-cost version is also available.

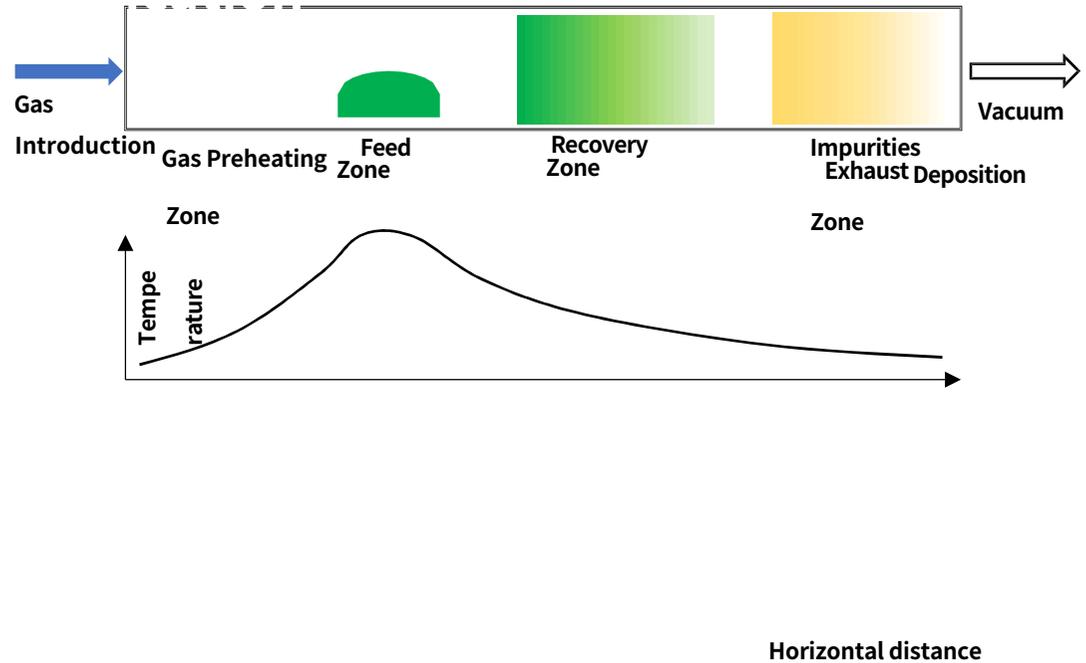
Purpose of Sublimation

- **High-Purity Purification: Removal of Impurities**
- **Drying: Removal of Solvent**
— **Suitability of Vacuum Processes**
- **Crystallization: Single crystal growth**
— **Purity**

Principle of Sublimation



Example of a phase diagram for organic compounds

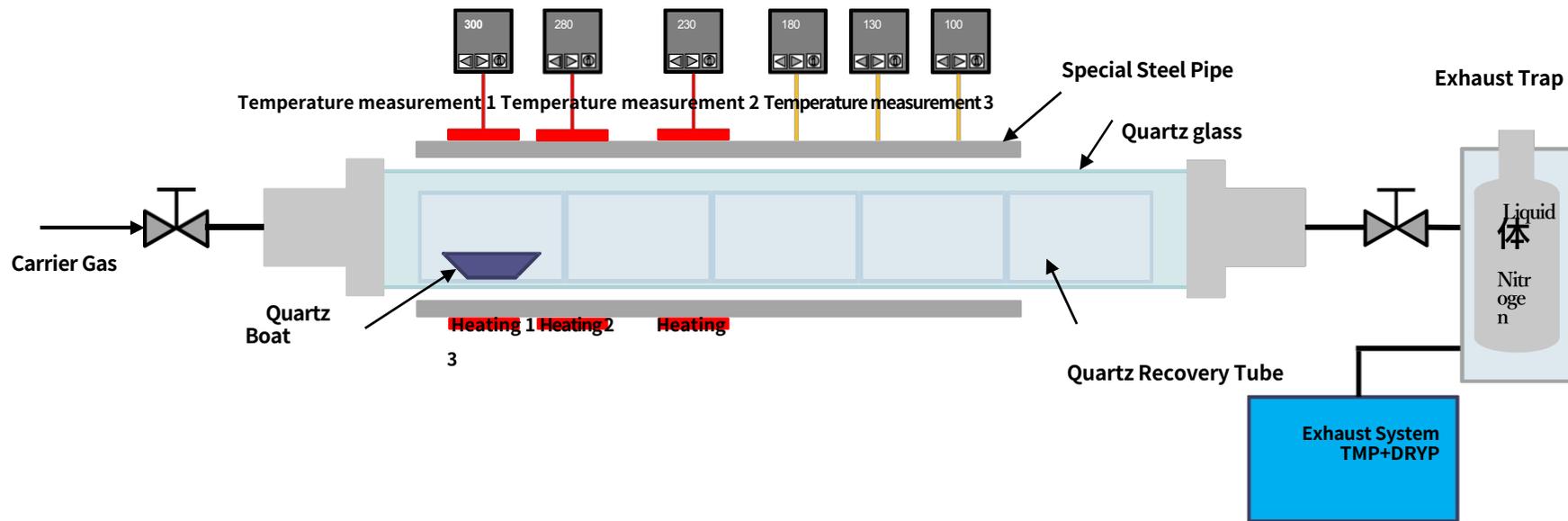


Sublimation purification by the train sublimation method

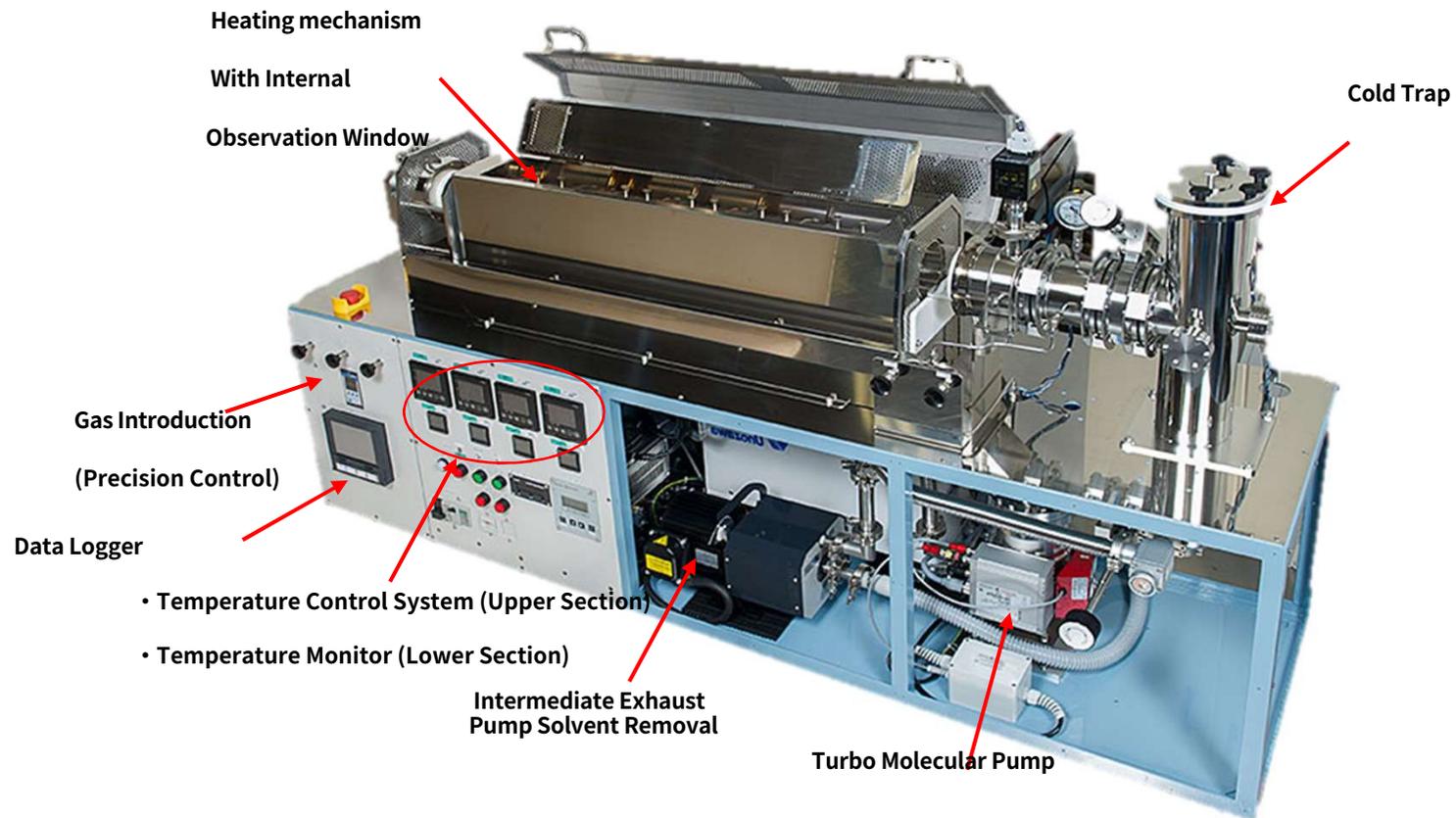
- Lowering vaporization temperature by vacuum
- Avoidance of thermal decomposition

1. Vaporization of raw material
 2. Transport of vaporized molecules: Diffusion, carrier gas
 3. Solidification of vaporized molecules: Raw material recovery, impurity separation
- ★Setting the temperature profile is critical

Configuration of Sublimation



Appearance of the



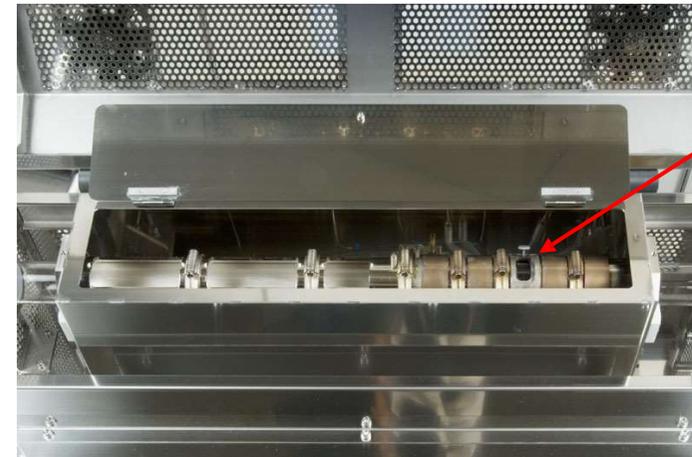
Device Feature 1

Unique Heating Structure

In conventional devices, the sudden temperature difference between heating sections prevented sublimated materials from separating cleanly, resulting in poor material recovery rates.

Our company has achieved a smooth temperature gradient using a unique special steel pipe to prevent temperature differences, enabling clean separation.

The special steel pipe includes a viewing window, allowing internal observation during heating.

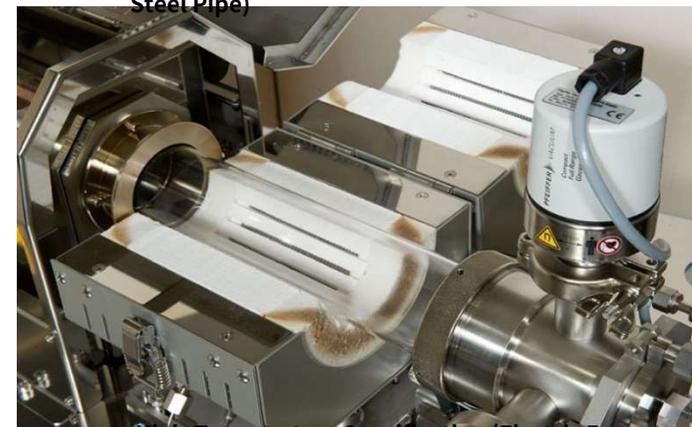


Internal
Observation
Window

Standard Specification (Special Steel Pipe)

Selectable Heaters

Heaters range from standard specifications up to 450°C to high-temperature specifications up to 700°C. The position and number of heaters can also be selected, enabling precise control of temperature gradients. Furthermore, temperature control can be switched between fixed-value control and program control. Additionally, when using single-sealed glass tubes, measures are taken to prevent the end temperature from dropping.



High-Temperature Specification (Electric Furnace + Special Steel Pipe)

Feature 2

Quartz Glass Tube Sizes

Various quartz glass tube sizes available, ranging from small-scale basic research sizes to small-scale production sizes

- Small-scale experimental size (Φ 20mm, Φ 33mm, Φ 45mm, Φ 5mm) Sample load: Approximately 5mg to 30g
- Small-scale production size (Φ 100 mm, Φ 150 mm) Sample loading capacity: Approximately 50 g to 500 g

Quartz Recovery Tube

By adopting the quartz recovery tube system, refined materials can be extracted without removing the quartz outer tube. Additionally, quartz inner tubes can be provided based on material precipitation properties. Quartz outer tube \Rightarrow Quartz inner tube \Rightarrow Quartz recovery tube

*Custom quartz collection tubes can also be manufactured.

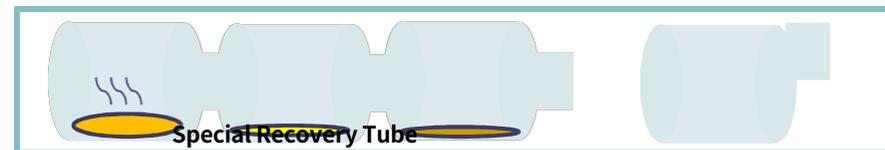
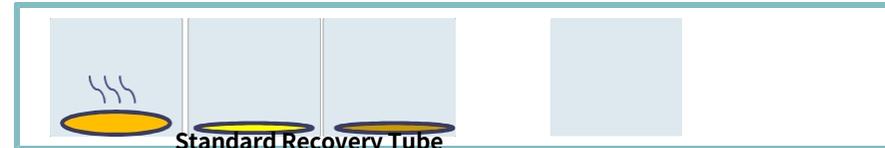
Quartz Inner Tube Shapes

Two glass shapes available to suit purification method applications Standard

sublimation type, Gas flow sublimation type
Straight-Type Glass Tubes

Standard sublimation type

Single-ended sealed glass tube



Device Feature 3

Fully dry exhaust system

The exhaust system is equipped with a completely dry and clean exhaust system as standard. Furthermore, by devising the exhaust piping system and installing an exhaust cooling trap, contamination of the vacuum exhaust pump caused by impurities in the raw materials is reduced.

Vacuum gauge

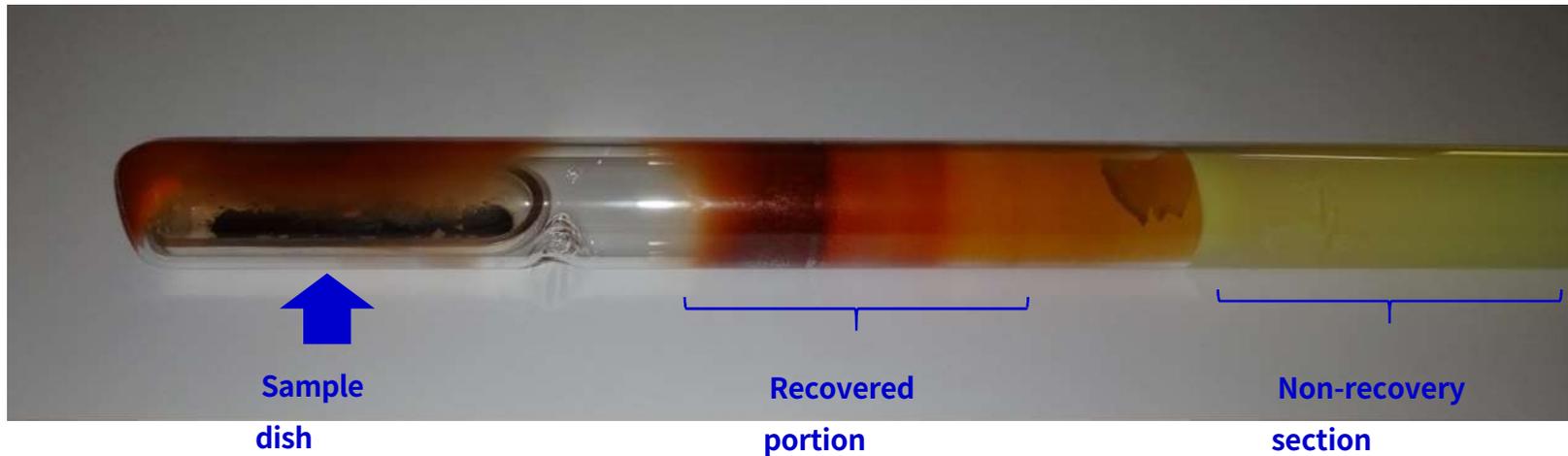
The vacuum gauge employs a full-range type capable of continuous measurement from atmospheric pressure to high vacuum. Furthermore, a cut-off valve is installed on the vacuum gauge to reduce contamination of the gauge bulb by impurities.

Carrier Gas Introduction Mechanism

A carrier gas introduction mechanism is standard equipment, enabling purification while introducing carrier gas. By precisely controlling gas flow rate and temperature without changing the apparatus configuration, it is also possible to obtain single crystal products.



Example of sublimation



Quartz inner tube after sublimation purification

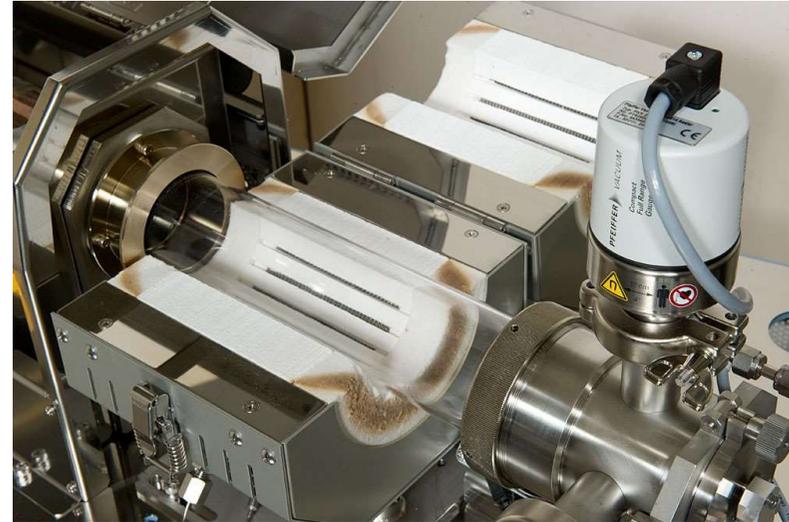
Standard Specifications of the Equipment

Model	P-20	P-100	P-100	P-150	P-200	P-400
Quartz Tube Outer Diameter [mm]	20	33	45	65	100	200
Quartz tube length [mm]	500	800	800	800	1200	1800
Heating Zone	3 (Maximum 5)	3 (Maximum 5)	3 (Maximum 5)	3 (Maximum 5)	3 (Maximum 5)	4 (out of 5)
Maximum Temperature [°C]	450	450	450	450	450	450
Exhaust System*	Option	TMP: 67 L/s Dry-P: 15L/m	TMP: 67 L/s Dry-P: 15 L/m	TMP: 67 L/s Dry-P: 15 L/m	TMP: 300 L/s Dry-P: 250 L/m	TMP: 700 L/s Dry-P: 500 L/m
Trap	Liquid Nitrogen	Liquid Nitrogen	Liquid Nitrogen	Liquid Nitrogen	Liquid Nitrogen	Immersion cooler
Gas introduction	Flow meter	Flow meter	Flow meter	Flow Meter	Mass Flow	Mass Flow
Estimated Processing Volume [g]	0.5-1.0	5-10	5-15	50-100	100-200	500-1,000
Unit Size	900x250x160 *Tabletop model	1,440 x 450 x 1,050	1,440 x 450 x 1,050	1,440 x 450 x 1,050	1,870x500 x1,195	2,650 x 800 x 1,650
Power	Single-phase 200V-15A	Three-phase 200V-15A	Three-phase 200V-15A	Three-phase 200V-15A	Three-phase 200V-50A	Three-phase 200V-75A

P-100 Standard



P-100 High-Temperature Specification (700°C)



P-200 Standard



Large-scale sublimation purification system: P-400



New
Product

Desktop Sublimation Purification System: P-20

This device is a standardized, compact desktop-sized sublimation unit, complementing our popular sublimation purification series.

- 1) It is an affordable device.
- 2) The purification section structure incorporates our proprietary heating concept
- 3) Quartz Furnace Size
Its small diameter allows efficient use for small sample quantities. Outer tube: f20 (OD) x f18 (ID) x 500L; Inner tube: f17 (OD) x f15 (ID) x 500L
- 4) The purification furnace section and pump section can be purchased separately.
 - ① Your existing pump can be easily installed.
 - ② For high-purity purification, we recommend the standard pump unit. The standard pump consists of a turbo molecular pump and a diaphragm pump.
 - ③ For cases where purification is the absolute priority with minimal investment, connection to your existing equipment, such as a rotary pump, is possible. It can be connected.
- 5) Our engineers do not perform startup procedures. This unit is delivered via consolidated shipping.
Customers can unpack it and assemble components like quartz glass tubes for immediate use.

