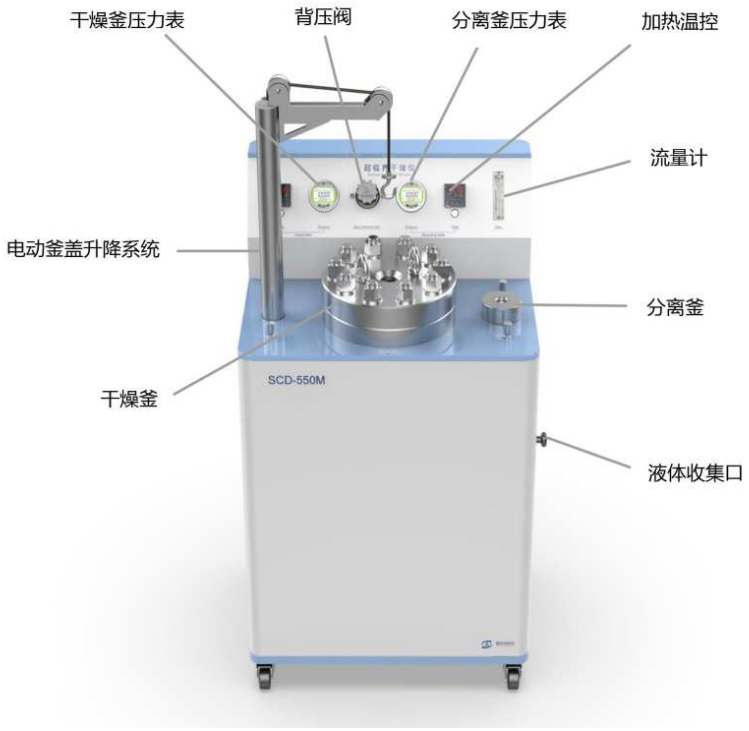
Manual Supercritical Fluid Dryer SCD-550M

Working Principle:

Supercritical CO_2 has gas-like diffusivity and liquid-like solvation power under supercritical condition (temperature >31.26°C, and pressure >7.29 MPa). With its low viscosity and low surface tension, supercritical CO_2 can quickly penetrate into the mesopores and micropores of a solid matrix. Therefore, the rate of drying with supercritical CO_2 is much faster and efficient than that of traditional methods. During drying process, the sample could be "conditioned" with ethanol and then supercritical CO_2 solvates the "ethanol/water" complex and has the water driven out subsequently.

In traditional drying method, water is expelled from sample by heating or freezing. This will produce some surface tension changes and will destroy fine structures of the samples such as nano-materials, aero-gel, bio-materials, MOFs, unstable porous materials, etc. In supercritical CO_2 drying, the surface tension at the supercritical CO_2/sample interface will be zero, therefor, fine structures of the sample are preserved.

Floor Model



Dimension

Technical parameter:

- Aerogel sample drying: large volume design, multi-layer structure or multi-sample mechanism, can be tailored made for users;
- Special high-pressure sample chamber design: the vertical sample cavity with top sample filling and the bottom liquid discharging. Top sapphire viewing window is available as optional item;
- Automatic temperature control: only need to choose the refrigeration or heating mode, the automatic temperature control module with PID algorithm will automatically control the temperature within the specified range;

- High pressure resistance design: the normal working pressure of the instrument is 0-10 MPa, and the design system resistance pressure is above 15 MPa to ensure safety and reliability.
- Safety design: instrument is equipped with an automatic overpressure relief system;
- Accurate flow control: Micro metering valve accurately control the Liquid CO_2 flow;
- CO_2 High pressure pump: flow rate of 0-100 mL/min, working pressure of 0-40 MPa, with pump head cooling, with sapphire viewing window and CO_2 recovery module. Constant flow and constant pressure mode is available as optional items
- CO_2 recovery system: consist of CO_2 recovery pump + two-stage gas purification device
- Temperature and pressure control: provides automatic system stability;
- High pressure sample chamber: equipped with sapphire viewing window and lighting system for observation of drying process;
- Filter system: complete filtration system is built to protect samples and delicate valves;
- Sample holders: a variety of sample holders are available to suit various types of materials;
- Dryer enclosure design: all tubing and valve are made of stainless steel, suitable for CO_2 and ethanol; integrated electric chamber cover lifting system, easy to operate and user-friendly; corrosion resistant cabinet with power supply, heating, cooling, pressure modules, etc.

Features and Benefits:

1. Integrated design for aerogel drying with small footprint and user-friendly;
2. Using more precise and delicate valves and tubing, under the premise of ensuring pressure resistance, improve the accuracy of pressure and flow;
3. Accurate control of intake and exhaust speed to prevent the damage of gel samples, which is of great significance for research samples;
4. Special carbon dioxide high pressure delivering pump, with constant flow and constant pressure mode, small volume, low noise, suitable for laboratory users;
5. Many extraction chamber sizes are available, 3L - 30L optional, support customization; separation kettle with window, can observe the drying process in different time periods;
6. CO_2 recycling, save operation cost.

Standard accessories:

- Flexible high pressure Liquid CO_2 tubing, 1.5 M, connecting cylinders and instruments;
- External filter (filter size: 0.5 μm), equipped with high pressure tubing;
- 2 anti-static drainage tubing, 1.5 M each;
- Spare seal (10) for drying chamber and separation chamber;
- A set of installation tools;
- Operation manual and user guide;
- One-year warranty and lifetime free technical support.

Users need to be equipped with:

- 40L steel bottle of CO_2 with dip-tube (preferable)
- 99.9% pure ethanol (or other applicable media)

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