



SOPHAS-Cat

Universal System for Catalyst Synthesis



Sophas-Cat has been specially designed for Catalyst Synthesis. The synthesizer is based on an X-, Y-, Z-, pipetting station. All functions needed for synthesis, heating, cooling, mixing, vacuum filtration, powder dispensing and liquid handling are integrated into the platform. The system has 3 vortexing reaction stations, 2 with software controlled heating from ambient to 150°C, one with cooling down to -40°C or optional -80°C.

For the reactor stations, various reactor blocks with the footprint of a micro plate are provided. As a standard, design blocks with 96 (1.2 or 2ml), 24 (7 to 10ml) or 8 (20 to 24ml) glass or PTFE reactors are available. Special reactor blocks e.g. for ceramic reactors, are available on request. Also borosilicate glass, quartz or PTFE reactor plates can be used.

The integrated robotic arm of Sophas-Cat transports the reactor blocks to the various reactor stations and positions for heating or cooling, pipetting and parking on the instrument. The arm also operates the vacuum station, it can open and close the vacuum block, insert the receiving rack and exchange the filtration (SPE) block or cartridge rack. The robotic arm also can pick up additional tools such as a powder dispenser, temperature probe, pH-electrode or overhead stirrer.

The powder dispensing tool REDI, automatically distributes fixed or variable amounts of dry powders into the reactors. Liquid reagents and gases (nitrogen, argon, etc.) and vacuum are distributed by 4 individually spacing patented 2- or 3-channel probes. The fixed volume REDI tool comes with a set of 5 calibrated volume tips. Options available are a manually adjustable tip or a software controlled variable volume tip (REDI VARIX®) which automatically selects any desired volume. The standard REDI tool delivers volumes from 45µl to 255µl, which equates to 10mg to 150mg of dry powders normally applied in synthesis. Up to 20 individual powder reservoirs can be placed on the platform.

Solvents and reagents are distributed by the four independently operated 2- or 3-channel probes. Each probe is connected to 2 precision syringe pumps. As the needles provide variable spacing from 8 to 38mm Sophas-Cat can handle any format of reactor blocks and racks. Two liquids can be delivered at the same time through parallel channels in the probe, while the third channel can provide vacuum or gas. For special purposes, each Z-rack can be equipped with a different probe (piercing probe, multi channel probe, filtration probe, spraying probe etc.). The functions of the probes are controlled by the WinSophas software.

Inert gas control can be provided for reactors and reagents. Inert gas automatically can be added or drawn if reagent is aspirated or delivered to a reactor or reservoir. Special chemically inert septa for reactors and reagent bottles have been developed for Sophas. A safe, non reactive reflux unit, which uses gas cooling, can be provided as an option.

WinSophas, Windows-NT based Software controls all functions of Sophas-Cat. The Software offers maximum flexibility for any synthesis strategy or chemistry. Network communication, exchange of data (via Excel® or ASCII-files) allows easy integration into existing environments.

Technical Data

Dimensions: 1200 x 710 X 600 mm
Work area: 1000 x 290 mm
Weight: 95 kg

External Supplies: Argon, Nitrogen, air pressure, solvents

Power Supply: 3 x 220/230 V 50 Hz (1 KW, 1 KW, 2 KW)
3 x 100/120V 50-60 Hz (1 KW, 1 KW, 2 KW)

2 high speed, low noise vortexers with integrated heating (+150°C)
1 high speed, low noise vortexer for cooling (-40/-80°C)
software controlled recycling cooler -40°C
vacuum box for 96-well SPE-block or cartridge rack
software controlled pulsed vacuum
4 patented 3-channel filtration probes
8 precision syringe pumps with 2.5 ml syringes
active wash and drying station for probes
1 high-flow 6-way valve for 6 system media
1-channel flow control for inert gas (argon)
4-channel flow control for nitrogen (inert reaction gas)
4-channel flow control of vacuum
4-channel chemically resistant vacuum pump
1 reagent rack for 4 x 300 ml reagents
2 building block racks for 48 x 24 ml vials
3 standard DESYRE® blocks

Hardware Options

High capacity recycling cooler (ambient to -80°C)
REDI® fixed volume powder pipette pick-up tool
1 powder reservoir (10 ml) with shaker
5 exchangeable fixed volume tips (45, 95, 150, 200, 255 µL)
Reflux control for DESYRE®-Reflux reactor block

Software

32-bit controlling-software based on WINDOWS-NT® operating system:

- Maximum flexibility to create synthesis-methods (chemistry)
- Adaptability of changing tasks (solid phase and liquid phase synthesis)
- All system functions are parametric (volume, measurement and movement speed, separation air gap, liquid level detection, valve-control, flow rate-meter, gas-pressure, temperature of heating and cooling station)
- Switching and controlling of external devices
- External development of new synthesis and configuration of new workbench layout
- Communication with external databases (e.g. Oracle, Isis)
- Self-teaching layout-tool
- Self-configuration of the layout
- Realtime-control synthesis-steps on the screen (solvent, reagent, temperature, volume, timetable)
- Compilation of synthesis-steps by drag and drop
- Complete audit trail of the synthesis

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