

MICROCHEM

Laboratory Microwave Reactor

The MicroChem is a microwave powered generator which is has been specially designed for research purposes. Its unique solid-state technology allows for accurate power delivery, frequency tuning, and reflected power measurement. The option for tilting reactor allows optimization of the experiments on solid and liquid samples.



APPLICATIONS

GENERAL CHEMICAL APPLICATIONS

- Chemical synthesis
- Extraction
- Drying
- Digestion
- Polymerization
- Thermal decomposition...

Liquids can be from low to high polar liquids (ethanol, water, brines).

Solids can be from low to high polar solids. The solids include biomass, carbon-based species, inorganic minerals, polymers...

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KEY BENEFITS

RESEARCH OPPORTUNITIES

- Fast screening of the samples
- Options to interact with the sample during MW run
- Monitor of MW energy absorbed by the sample in real-time
- Opportunity to determine thermodynamic and the kinetic constants of the process
- Options to monitor parameters of phase transition reactions in real-time
- Optimization of electric field depending on sample dielectric properties and volume

TECHNOLOGY

- Solid-state, air-cooled generator
- Accurate control of the applied MW power (1 W step)
- Frequency autotune for the efficient MW interaction
- Control of reflecting power
- Cavity tilting for homogeneous heating of materials with different permittivity properties

DESIGN

- Compact and advanced design
- Changeable cavities depending on the research aims
- Control via laptop connection and data collection
- Easy access to the reactor

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REACTORS

The system is designed not only to heat the product but to analyse the microwave effect.

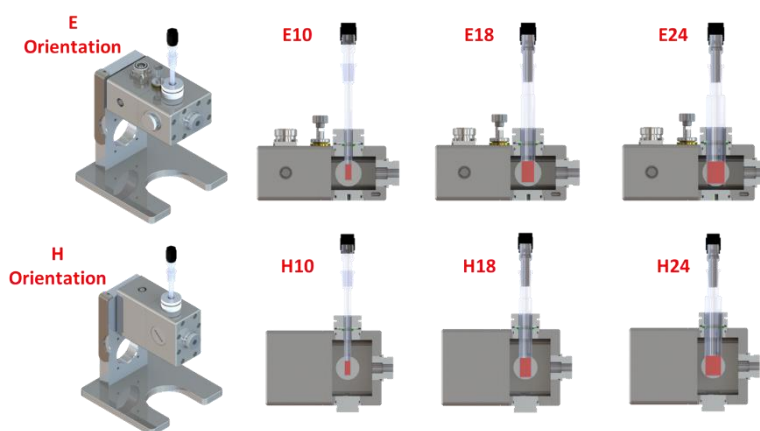
The typical monomode cavity implies parallel electric field distribution, meeting a sample in a cylindrical vial. This configuration provides the maximum interaction between microwaves and the sample even for materials with low absorption properties. For the samples with high absorption, we have developed perpendicular electric field distribution. This solution resolves the issue of low penetration of microwaves inside the volume of the high absorptive materials, facilitating efficient and homogeneous heating.

A switch between parallel and perpendicular electric field distribution extends a list of compounds suitable for controllable and volumetric microwave heating, matching the majority of the products.

MICROCHEM S REACTOR – 25 mL TILTING CAVITY



On the 25 mL reactor, a mechanical system allows changing the orientation of the applicator to irradiate the product either in parallel or perpendicularly to the electric field. This system allows for the homogeneous heating of materials with low and high permittivity properties.



- E-orientation and H-orientation provide parallel and perpendicular orientations of the electric field -

MICROCHEM L REACTOR – 100 mL VERTICAL CAVITY

The 100 mL reactor is designed for reactions necessitating larger volumes. The 100 mL reactor orients the product perpendicular to the electric field, which is the most suitable configuration for large volumes.



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KEY SPECIFICATIONS

Generator Reference	MicroChem
Microwave generator	<ul style="list-style-type: none"> • Solid state technology • 0 to 200 W (with 1 W steps) • N-type coaxial cable • Air cooled
Frequency	<ul style="list-style-type: none"> • 2400 to 2500 MHz (with 0.1 MHz steps)
Reactors	<ul style="list-style-type: none"> • Batch mode (included) and continuous mode is optional • Aluminum alloy • 1 adjustable stub for impedance matching • Special conditions in a vial (inert atmosphere, H₂...) • Magnetic stirring (option) • Atmospheric pressure • High-pressure reactor for 10 bar (option)
Reactor's capacities	<ul style="list-style-type: none"> • MicroChem S reactor: 1-25 mL - Tilting to match product permittivity • MicroChem L reactor: 40-100 mL
Temperature measurements	<ul style="list-style-type: none"> • Optical fiber (T°max = 200°C) • Optical/infrared pyrometer possible (>500°C/15 mins)
Control interface	<ul style="list-style-type: none"> • Genelink Software to control MicroChem from your computer • Programmable and controlled parameters: Pi (W), Pr (W), Pa (W), T (°) • Alarms can be set and activated when the measured temperature exceeds the set temperature. • Self-adjusting PID temperature control • The regulation can be made from a parameter measured by your sensor (temperature or pressure) • Easy data collection from the laptop, historical tracking • Availability of the experimental parameters in the data file
Safety	<ul style="list-style-type: none"> • Compatible with our microwave leakage detector
Communication	<ul style="list-style-type: none"> • Modbus RS485 • External measurements
Mains	<ul style="list-style-type: none"> • 220-230 V / 50-60 Hz
Noise level	<ul style="list-style-type: none"> • 63 dB in a standby mode/ 69 dB in a full power mode
Generator dimensions	<ul style="list-style-type: none"> • 220 x 320 x 400 (W x D x H)
Reactors dimensions	<ul style="list-style-type: none"> • MicroChem S reactor: 200 x 219 x 272 (W x D x H) • MicroChem L reactor: 210 x 287 x 287 (W x D x H)
Weight	<ul style="list-style-type: none"> • Generator 15.5 kg • MicroChem S reactor 7.5 kg • MicroChem L reactor 4.9 kg