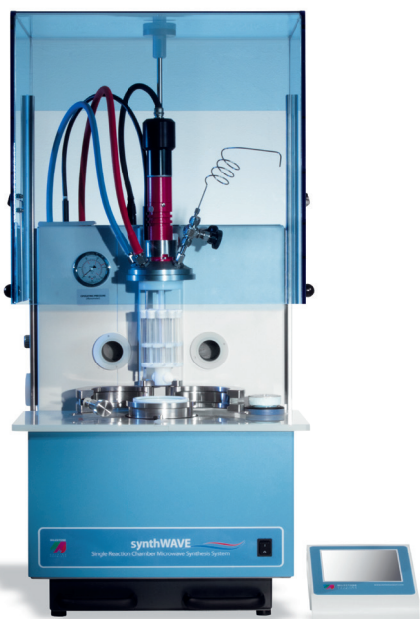




MILESTONE
H E L P I N G
C H E M I S T S

synthWAVE

ADVANCED FLEXIBLE MICROWAVE SYNTHESIS PLATFORM



THE BENEFITS OF MICROWAVE TECHNOLOGY

Microwave technology is changing the way to design and optimize synthetic protocols as well as their scaling up to multi-gram production. The last generation of dedicated microwave reactors enables a fast screening of reaction conditions by means of parallel tests, selecting best catalyst, solvent and conditions. Today microwave assisted synthesis has become a cutting-edge technology across the pharmaceutical, biotech, polymers, fine- and agro-chemical industries, with thousands of units installed worldwide.

MILESTONE synthWAVE

The new Milestone synthWAVE is designed for safe, reliable and reproducible scale-up of microwave-enhanced chemical reactions. It handles single or multiple reactions at temperatures up to 300 °C and pressures to 199 bar. Small-scale synthesis methods are easily transferred to the synthWAVE. Incredibly easy to use, the synthWAVE allows the chemist to run large-scale batch and parallel reactions like never before.

- REACTIONS COMPLETED IN MINUTES INSTEAD OF HOURS
- ENHANCED SELECTIVITY
- IMPROVED YIELDS
- LOWER BY-PRODUCTS FORMATION AND SAMPLE CONTAMINATION
- REDUCED ENERGY CONSUMPTION
- REDUCED QUANTITY OF SAMPLE/CHEMICALS ("ATOM ECONOMY")

THE BEST THINGS COME IN THREES

SRC Technology

Milestone's unique Single Reaction Chamber (SRC) technology overcomes the limitations of current microwave synthesis instrumentation. At the heart of the synthWAVE is a PTFE lined, 1 L stainless steel reaction chamber, which is also the microwave cavity. This allows the design of the microwave source to be perfectly matched to the cavity shape for optimum microwave distribution and fast, even heating. The chamber is pre-pressurized with gas to prevent boiling of the solution, and is equipped with mechanical and magnetic stirrers. The microwave cavity is water cooled, which greatly reduces reaction cooling time and increases productivity. Reaching up to 300 °C and 199 bar, the synthWAVE is capable of higher temperature and pressure than any other microwave system.

Rack and Vials

Reactions can be carried out directly in the 1L PTFE vessel, or in multiple vials. Vials are available in glass (disposable), quartz or PTFE, fitted with loose PTFE caps to ensure pressure equalization. Available rack configurations include 4, 5, 15 and 22 positions. Numbered rack trays give the operator an easy visual check of vial number. The synthWAVE sample racks fit easily on a balance, so reagents can be weighed directly into vials already loaded into a rack. No vessel assembly or disassembly is required, and with the disposable glass vials, no cleaning step is needed, greatly increasing work efficiency. Easily and conveniently sample reaction products at any time during the experiment.



TYPICAL APPLICATIONS

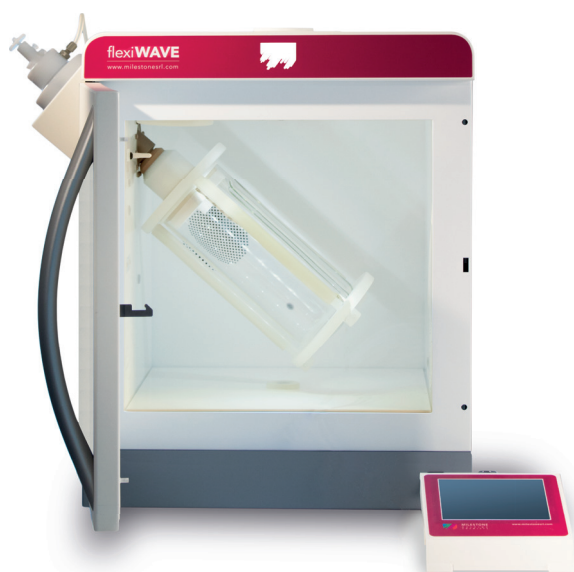
- OXIDATIONS AND REDUCTIONS
- ESTERIFICATION & AMMIDATION
- COATING
- POLYMERIZATION
- NANOPARTICLES PREPARATION
- MODIFICATION OF CARBON NANOTUBES
- REACTIONS WITH SENSITIVE REAGENTS AND MATERIALS
- DESULPHURIZATION
- CYCLOADDITIONS
- REAGENTS AND MATERIALS
- CLICK CHEMISTRY
- GAS INSERTION
- MULTICOMPONENT REACTIONS



MILESTONE
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flexiWAVE

ADVANCED FLEXIBLE MICROWAVE SYNTHESIS PLATFORM



LARGEST MICROWAVE CAVITY AND HIGHEST MICROWAVE POWER

The new Milestone flexiWAVE microwave cavity has a volume in excess of 70 litres, by far the largest currently available. Why is this important and what are the main implications of this design? A large cavity allows the chemist to easily configure many different reactions setup in a very flexible environment. Starting from the classic synthesis glassware moving to high-pressure vessels working -alone or in parallel configuration, a large cavity is also fundamental to perform solid phase synthesis tasks. The flexiWAVE is equipped with two 950 Watt magnetrons for a total of 1900 Watt making it the most powerful microwave platform system available for organic and inorganic synthesis.

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THE BEST THINGS COME IN THREES

One. Classic Glassware



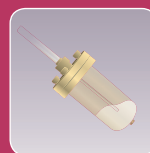
The flexiWAVE has been thought and engineered as a 'microwave platform', where all types of commonly used glassware could be used. This clearly results in a very flexible system, with a wide range of applications capabilities. The Classic Glassware setup, for instance, provides the suitable apparatus for a full reaction optimization, for research or teaching purposes. It allows the chemists to perform synthetic reactions under reflux and, in this manner, any chemical reaction currently carried out with hot plates, heating mantles or oil baths, could be rapidly improved by adopting microwave technology.

Two. High-Pressure



Stubborn reactions are typically carried out in refluxing conditions, using high boiling solvents such as xylenes, 1,2 - dichlorobenzene and N-methyl pyrrolidone. High boiling solvents are then difficult to remove upon work-up, especially as reaction scale increases. The High-Pressure setup is capable of replacing reflux devices, moving from high boiling solvents to low boiling solvents. Moreover, high temperature reactions (up to 300 C) are allowed. The benefits are well known and documented in terms of easier work-up and products purity.

Three. Solid-Phase



Heating heterogeneous reaction mixtures, thick media or solid phase systems suffers of inhomogeneous temperature distribution and stirring difficulties using conventional microwave instruments. The innovative Solid-Phase setup offers the unique capability of physically rotate the reaction vessel, to achieve very homogenous bulk heating of slurries, viscous and solid reaction mixtures media. Functionalization and modifications of materials, polycondensation, coating, dehydration of natural oils are some of the most common area of application.

BEST REACTION CONTROL

The new Milestone flexiWAVE is equipped with the most advanced yet easy to use reaction sensors for the most complete control of the reaction process. Temperature can be followed by fiber optic and infrared sensors. When performing parallel reactions, a contact-less sensor is used to control each and every vessel, and the actual temperature values are shown on the instrument control terminal, allowing an instant visual check of the reaction conditions.

USER INTERFACE

The flexiWAVE is controlled via a compact terminal with an easy-to-read, bright, fullcolour, touchscreen display. The terminal is provided with multiple USB and Ethernet ports for interfacing the instrument to external devices and to the local laboratory network. The terminal runs a completely new user-friendly, icon-driven, multi-language software to provide easy control of the microwave run.