



Hydrothermal Autoclave

Hydrothermal synthesis includes the various techniques of crystallizing substances from high-temperature aqueous solutions at high vapor pressures. In the last decade, the hydrothermal technique has offered new branch of science and technology for sustained human development.

Chemical engineering issues dealing with these unique features take the hydrothermal technique altogether in a new direction for the 21st century.

The hydrothermal technique is applicable in the processing of nanostructural materials for a wide variety of technologies such as electronics, optoelectronics, catalysis, ceramics, magnetic data storage, biomedical, biophotonics, etc.

The main disadvantage of the hydrothermal system is the black-box nature of the apparatus; so we had decided to study kinetics of the hydrothermal processes, by the aid of an autoclave, which greatly helped the understanding of aspects and new view points of this technology.



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The Power of Innovation

- ✓ P.I.D controller for accurate settings
- ✓ Relief Valve for more safety
- ✓ NPT high-pressure steel lines supplied
- ✓ Valves for injecting and purging gas
- ✓ A further timer for recording time
- ✓ Programmed heating with 10 segments
- ✓ Thermo metering reactor individually
- ✓ System is isolated for energy saving
- ✓ Glass line for corrosive materials



**Enhanced
C-Board**



Applications for such as:

- * **Advanced metal oxide Nanomaterials**
- * **Processing of TiO₂ and ZnO Nanoparticles**
- * **Processing of metal Sulphides Nanoparticles**
- * **Synthesis of carbon Nanoforms**
- * **Hydrothermal preparation of Nanotubes**
- * **Processing of Hydroxyapatite (HAp)**
- * **Processing of composites**
- * **Recycling waste treatment**
- * **Leaching of ores in metal extractions**





Specifications	
Sizes, mL	65
Max. Pressure	5000 psi (350 bar)
Max. Temperature	500 °C
Vessel Style	Fixed Head
Further Sealing	Silicon ring
Valve Connections	1/4" NPT Female
Pressure Gage Size	2.4 inches
Range	0-3600 psi (250 bar)*
Heater thermo meter controller	Programmable
Reactor thermometer	Just detecting
Heater Style	Ceramic
Heater Power Watts	1500
Electrical Supply	
Volts	220
Vessel Dimensions	
Inside Diameter	2 inches
Inside Depth, inches	5.12
Wall thickness	0.5 inches
Controller Dimensions	
Width, w/o Controller	11.81 inches
Depth	15.75 inches
Height, inches	7.9 inches
Protection for corrosive materials	
Glass line	Pyrex
Thickness	0.16 inches
Outside diameter	1.93 inches
Height	5.10 inches

The Way to Get Results!



Hydrothermal procedure in nutshell;

Advanced materials processing using hydrothermal technology has lots of advantages owing to the adaptability of the technique, which is also environmentally benign.

A typical hydrothermal procedure is as follows: The precursor substance (nutrient) is put at the bottom of the reaction vessel. The reaction vessel is filled to the desired degree with the solvent (water and mineralizer). This slurry is heated to the desired reaction temperature. At this temperature the nutrient materials react and/or transform, primarily through dissolution and precipitation, to the stable compound. After cooling the autoclave, the product is isolated by filtration and washed in order to obtain the pure products.





Important notifications before operating system!

- ➡ **Wear lab glasses and/or goggles, a lab coat, and heat-resistant gloves when working with an autoclave.**
- ➡ **Do not place sharps or other pointed materials freely inside an autoclave bag but instead place them in a sharps or other solid container.**
- ➡ **Do not overfill autoclave bags and/or the autoclave as this may lead to incomplete decontamination of the autoclave contents**
- ➡ **Never attempt to autoclave flammable or volatile solvents as they represent a serious explosion hazard.**
- ➡ **Never leave an autoclave unattended while it is in operation.**
- ➡ **If an accidental release or spill takes place inside the autoclave, wait until the autoclave is cool before attempting to clean up the spill.**



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