Supercritical Hydrothermal System

Hydrothermal synthesis can be defined as a method of synthesis of single crystals, depending on the solubility of minerals in hot water under high pressure. The crystal growth is proceeded in an apparatus consisting of a steel pressure vessel called autoclave while the hot water plays a role in supercritical water at critical point.

The advantages of the hydrothermal method over other types of crystal growth include the ability to create crystalline phases which are not stable at the melting point. Also, materials which have a high vapor pressure near their melting points can also be grown by the hydrothermal method. Higher diffusion ability of solute enables higher speed of growth which is a driving force that the particle is minimized.

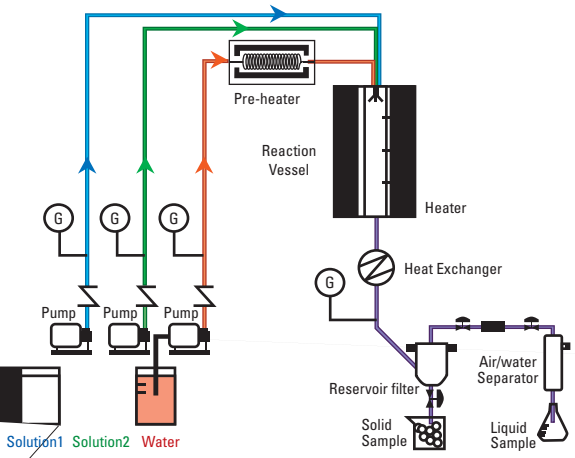
Application

- Synthesis Seria & Seria-Zirconia Mixed
- Synthesis Boehmite
- Synthesis Barium Titanate
- Cathod Material Synthesis for Lithium Battery
- Synthesis Zinc Oxide & Titanium Oxide
- Synthesis Magnetic Oxide
- Synthesis Catalysts, Electric Devices, Solid Oxide Fuel cell, Magnetic storage, Phosphor, Optical Materials, etc.

Features

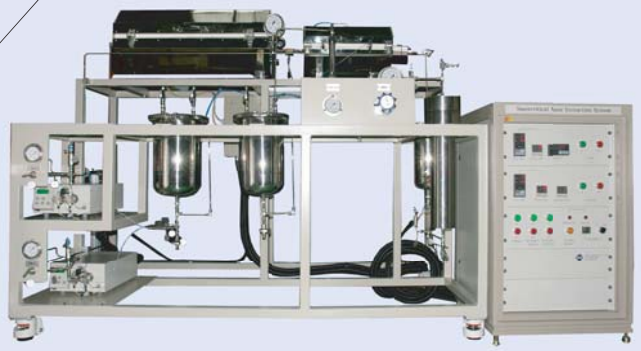
- Dissolved well in solvent.
- Increase diffusion ability.
- Suitable to use for all solid types.
- Does not create hydroxyl group

Supercritical Hydrothermal Synthesis Process



R & D Equipment

R & D Equipment



Plant

Plant

Specification

Type	R & D Equipment (Batch Type)	R & D Equipment (Continuous Type)	Plant (Continuous Type)
Product			
Reaction Vessel	- Material : INC600 - Max. Working : 5,000psi@600℃ - Volume : 1 L - Cover Type :Bolt Closure - Gasket : INC600 - MagneDrive	- Tube Type - Material : INC600 - Max. Working : 5,000psi@600℃ - Volume : 0.05 L ~ - Gasketless	- Tube Type - Material : SUS316 - Max. Working : 5,000psi@450℃ - Volume : 2.8 L ~
Pre-Heater	- N/A	- Ceramic Mold Vertical Type - Max. Working : 5,000psi@600℃ - 380VAC, 3-ph, 10kw	- Plange Sheath Type - Max. Working : 5,000psi@450℃ - 380/440VAC, 3-ph, 100kw
High Pressure Pump	- Moter Driven Plunger Type - Max. Outlet Pressure : 5,000psi - Max. Flow Rate : 140ml/min - 220VAC, 3-ph, 1HP	- Moter Driven Plunger Type - Max. Outlet Pressure : 5,000psi - Max. Flow Rate : 24ml/min - 220VAC, 1-ph, 0.16 HP	- Electro-Hydraulic Driven Piston Type - Max. Outlet Pressure : 5,000 psi - Max. Flow Rate : 5/min - 220VAC, 3-ph, 3HP - Accumulator
Reaction Heater	- Furnace or Band Type - 220VAC, 1-ph, 3kw	- Ceramic Mold Horizontal Type - 380VAC, 3-ph, 6kw	- Ceramic Mold Vertical Type - 380/440VAC, 3-ph, 10kw
Condenser	- N/A	Shell in Tube type - Max. Pressure : 5,000psi - Temp Range : 0~50℃ - Cooling Rate : 450℃ → 30℃	Internal Coil type - Max. Pressure : 5,000psi - Temp Range : 0~50℃ - Cooling Rate : 450℃ → 30℃
Filtering Vessel	- N/A	- Material : SUS304 - Max. Working : 5,000psi@80℃ - Volume : 2L - Cover Type :Bolt Closure - MagneDrive - SUS Mesh Filter Integrated	- Material : SUS304 - Max. Working : 5,000psi@80℃ - Volume : 70L - Cover Type :Bolt Closure - MagneDrive - SUS Mesh Filter Integrated
Solution Tank	- N/A	- Material : SUS304 - Volume : 3L	- Material : SUS304 - Volume : 250L
Receiver Tank	- N/A	- Material : SUS304 - Volume : 20L	- Material : SUS304 - Volume : 2500L
Option	- N/A	- Data Acquition	- Data Acquition

* Can be changed upon customer's requirements.