MICROFILTRATION
ULTRAFILTRATION
NANOFILTRATION

SEPARATION
EXTRACTION
CONCENTRATION

FOCUS ON
INORGANIC CERAMIC MEMBRANE
PROJECTS AND APPLICATIONS

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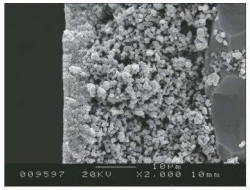
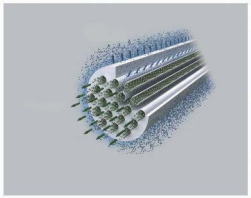


Inorganic ceramic membranes are made from alumina, zirconia, titanium oxide; the precision ceramic material is with porous structure : porous support layer, transition layer and microporous membrane layer , and asymmetrically distributed; Filtration precision: microfiltration , ultrafiltration, nanofiltration.



Inorganic ceramic membrane characteristics

- Narrow pore size distribution, high separation efficiency, and stable filtration effect.
- Good chemical stability, resistant to acid, alkali and organic solvents.
- High temperature resistance, steam recoil regeneration and high-temperature sterilization.
- Strong anti-microbial contamination ability, suit for the biomedicine application.
- High mechanical strength, backwash under high pressure, and has strong regeneration ability.
- No dissolution, no secondary pollution, and no negative impact on the separated materials.
- Simple separation process and operation process, low energy consumption.
- With long life

support material : α-Al2O3

Pore size : 0.8μm,0.5μm,0.2μm,0.1μm,50nm,30nm,20nm,10nm

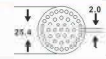
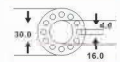
membrane material : Zirconia

Length: Optional specifications and lengths

compression strength : 1.0Mpa

pH range : 0~14

Model	Scheme	Channels No	length/pc/mm	Membranearea/m2	Preview
Φ10-1-6		1	500		
			1000	0. 019	
			1200	0. 023	
Φ12-1-8		1	500	0. 013	
			1000	0. 025	
			1200	0. 030	
Φ25. 4-1-16		1	200	0. 01	
			1000	0. 05	
			1200	0. 06	
Φ25. 4-7-6		7	1016	0. 13	
			1100	0. 15	
			1178	0. 16	

Φ25.4-19-3.3		19	1016	0.20	
			1100	0.22	
			1178	0.23	
Φ25.4-37-2		37	1016	0.23	
			1100	0.26	
			1178	0.28	
Φ25.4-9-6		9	1016	0.17	
			1100	0.19	
			1178	0.20	
Φ30-13		13	1016	0.2	
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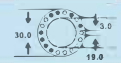
			1200	0.24	
Φ30-19		19	1016	0.23	
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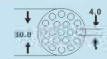
			1200	0.19	
Φ30-19-4		19	1016	0.24	
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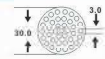
Φ30-37-3		37	1016	0.35	
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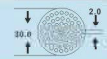
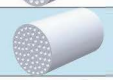
Φ30-61-2.0		61	1016	0.40	
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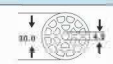
Φ30-19-4		19	1016	0. 25	
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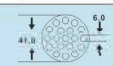
Φ41-19-6		19	1000	0.36	
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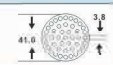
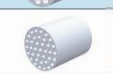
Φ41-37-3.8		37	1000	0.44	
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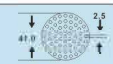
			1200	0.53	
Φ41-61-2.5		61	1000	0.48	
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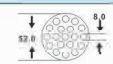
Φ52-19-8		19	1000	0.48	
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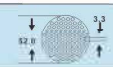
Φ52-85-3.3		85	1000	0.88	
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			1200	1.06	

Ceramic membrane Housing

The inorganic ceramic membrane housing is a pressure-resistant shell assembled with ceramic membrane elements. The membrane filling area of a single membrane housing ranges from 0.05 square meters to 20 square meters. The shape design and sealing design are important for the complete system operation. This series of components can be produced in dozens of specifications and models with different filtration precisions and different types of membrane tubes to meet the different technical requirements and different processing volumes.

- Number of loaded membrane elements: 1, 3, 7, 12,19, 37, 61, 91 cores
- Matching membrane element length and diameter:
- Length: 250- 1200mm
- Outer diameter 12mm/25mm/30mm/40mm/60mm
- Main body material: SUS304, SUS316(L), Titanium, Polypropylene
- Sealing material: EPDM rubber, fluorine rubber, silicone rubber, etc.
- Interface form: flange, clamp, union/DN15-400
- Standard: ISO, DIN chemical grade, sanitary grade

Laboratory equipment

We provides various of specifications and pore sizes ceramic membrane testing equipment and organic nanofiltration and ultrafiltration testing equipment. It is equipped with complete membrane components, instrumentation testing, sophisticated processing technology, compact and beautiful equipment, simple operation and convenient maintenance, and provides various technical support and consultation, it is the best choice for universities, scientific research institutes, and enterprises to conduct membrane application research, development, and project verification.

- Specification name: ceramic membrane testing equipment
- Material: 304ss/316L
- Number of membrane elements: Single component or double component series and parallel connection
- Membrane element length: 250~1200mm
- Equipped with membrane elements: OD25- 30-40/MF-UF-NF
- Work pressure: 1.5~ 6.0bar.
- Membrane surface flow rate: 2-6m/s
- Operating temperature: <150°C
- Circulation irrigation: 30- -200L
- Pump: Stainless steel centrifugal pump
- Heat exchanger: Optional jacketed, tube or coil type
- Backwash device: Automatic pulsating backwash
- Control method：automatic control

Organic Membrane Testing Equipment

The company sells GE membrane, Coriolis membrane, Dow membrane, Haidemeng membrane and Korean membrane.

This series of equipment combines three filtration levels: ultrafiltration, nanofiltration and reverse osmosis, and is fully suitable for the food industry, beverage industry, plant (drug) deep processing, Chinese patent medicines, health products, and agricultural product processing. Extraction, separation, purification and concentration in deep processing of water (sea) products, biomedicine, biological fermentation, fine chemicals, water treatment, environmental protection and other fields.

Performance description and advantages

In order to meet the needs of scientific research institutions and universities for new technology, new product development, application and small batch production, a series of multi-functional organic membrane equipment has been produced.

Through this equipment, the important process operating parameters, technical testing indicators and corresponding cleaning plans on membrane performance influence curvescan be obtained. The test data is completely reliable and is a precious basic data for industrial amplification design.

This series of equipment is extremely practical, has full functions, good quality stability, high product quality and yield, high process integration, low investment, small footprint, low operating cost, easy operation and maintenance, and long membrane service life. It has become one of the best-selling products of TopU Tech Company.

Industrial water treatment

- garbage leachate
- Steel plant cold rolling emulsion wastewater
- Banknote printing and cleaning wastewater
- Automotive industry wastewater containing emulsion
- Cutting fluid and degreasing fluid wastewater in the machining industry
- Alkaline refining and washing wastewater in the oil industry
- Industrial acid and alkali wastewater
- High-concentration COD/BOD wastewater such as fuel and bleaching and dyeing
- Wastewater containing heavy metals and radioactive components
- Electroplating industry wastewater
- Chlor-alkali salt water

Biopharmaceutical

- Antibiotics: colistin sulfate, cephalosporins, inosine, erythromycin, etc. Fermented organic acids: lactic acid, citric acid, etc. Vitamins: vitamin C, vitamin B2, vitamin B12
- Chinese patent medicines: various single-prescription compound oral liquids and injections. Traditional Chinese medicine extracts, etc.
- Enzyme preparations: phytase, protease, etc.
- Biochemical products: thymosin, interferon, vaccines, etc.
- Natural product extracts: puerarin, soybean peptides, natural pigments, tea polyphenols, etc.

Petrochemical

- Catalyst recovery and enrichment
- Inorganic membrane catalytic reactor
- Product essence graded concentration
- Recycling of organic solvents
- Gas separation

Foods

- Dairy products: colostrum, yogurt, whey protein sterilization and concentration, protein standardization
- Alcohol: wine, beer, fruit wine, rice wine, etc.
- Fruit and vegetable juices: grass juice, red plum juice, pineapple juice, etc.
- Sugar: beet sugar, Sucrose, fixed powder sugar, etc.
- Brewing products: soy sauce, vinegar
- Deep processing of tea: tea beverages, catechins
- Soybean deep processing: polypeptides, isoflavones, oligosaccharides
- Deep processing of marine animal and plant products
- Amino acids:
  Lysine、Glutamic acid、Isoleucine、Glycine、Glutamic acid Ammonia L-phenylalanine、Cystine、Threonine L-Tryptophan、Proline、Arginine
- Organic acid
  Lactic acid、Citric acid、Itaconic acid
- Enzyme
  Phytase、Glycoamylase、Amylase、Cellulase
- Pectin extraction and concentration、Xylose concentration
- Kelp extract

The Filtration of Biological Fermentation Broth

In the production process of pharmaceutical products, mainly uses the biochemistry and biological fermentation to be the main production processes, for example:

- Antibiotics (cephalosporins, cyclomycin sulfate, erythromycin, etc.).
- Organic acids (lysine). L-lactic acid, citric acid , nucleotides),
- Enzyme preparations.
- Animal and plant extracts (thymosin, interferon, vaccines, polysaccharides, etc.),

In the semi-finished fermentation broth and finished liquid contains variouse of bacteria, proteins, organic antibodies and inorganic ions that may affect the production control and finished product quality, also affect the purity, even to scrap the products .

The sterilization and filtration of most fermentation broths still uses traditional separation equipments , such as:
plated frame filter, vacuum drums, centrifuges filters, diatomaceous earth filter machines, or flocculation sedimentation,
heating, isoelectric precipitation.
These methods have shortcomings , such as :

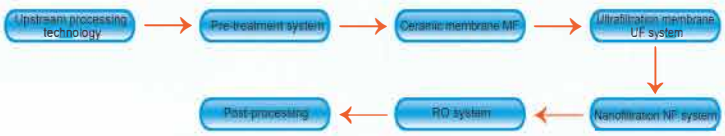
- only roughly separate solid impurities, mycelium, but the transmittance of the filtrate is not high. These residual insoluble and soluble impurities are one of the major obstacles for the subsequent process extraction and final product quality and yield .
- high labor intensity,
- low product yield,
- large washing volume in subsequent operations,
- high wastewater discharge and high concentration.

The Filtration of Biological Fermentation Broth

Process technology characteristics:
uses the biochemistry and biological fermentation to be the main production processes, for example:

- High separation accuracy to get the clear and transparent permeate liquid, greatly reduces the subsequent refining processes;
  Through dialysis circulation and high-fold concentration to increase the product yield.
- No need the additional additives, and the concentrated retentate (bacterial protein, etc.) can be recycled as feed;
- Wide applicability, can handle almost any strong acid and alkali oxidizing liquid, and is resistant to strong polar solvents;
- The membrane pores are rigid and the membrane material is inert, not easy to corrode and deform, and easy to clean and regenerate;
- Membrane channels of various sizes and shapes are available to meet various high and low concentration chemical liquid processing requirements;
- Long service life, localized auxiliary equipment, low equipment investment and operating costs;
- It can be operated and cleaned under high temperature and pressure for a long time, and even be reburned and regenerated;
- The external dimensions of the membrane elements are international standard, so can be matched and replaced with each other;
- Wastewater discharge and COD are significantly reduced, promoting cleaner production;
- PLC upper computer control, simple and reliable operation, greatly reducing labor intensity.

Integrated Membrane Separation Process



Deep Processing Of Agricultural Products

In the agricultural product processing industry, ceramic membrane separation is a increasingly valued new technology, It has the characteristics of no change of materials, normal (low) temperature and low pressure operation, and low energy consumption. It is very suitable for higher required materials to do the heat sensitivity and taste retention by concentrating and separating.
Inorganic ceramic membrane separation technology is a new stage in the development of membrane separation. Compared with organic polymer membranes, it has the advantages of high temperature resistance, resistance to acid and alkali corrosion, resistance to microbial degradation, easy cleaning, high pressure resistance and good mechanical properties.

Application in Soybean Deep Processing

Soybean deep processing mainly refers to the extraction of oil, soybean isoflavones, soybean protein isolate, soybean whey protein, soybean oligosaccharide, soybean lecithin, soybean protein peptides, defatted soybean powder, edible cellulose, etc.
Inorganic ceramic membrane Ultrafiltration separation technology extracts the soybean protein, use the molecular interception to concentrate the soybean protein , produce the isolated soy protein. This method can intercept soybean albumin to achieve the purpose of increasing yield, saving resources, and reducing production wastewater pollution.

We TopU Tech uses membrane integration technology of inorganic ceramic membrane filtration and organic membrane nanofiltration for deep processing of soybeans, which greatly improves product separation accuracy. It can make full use of soybean processing by-products (such as soybean dregs and soybean skin, soybean whey water), and greatly improve the added value of soybean industry chain , it brings new profits ways for soybean deep processing enterprises.

The process route as follows :

Application of Ceramic Membrane In Banknote Printing Wastewater Treatment

Researched on the membrane filtration process, selected the appropriate membrane pore size, the operating parameters were optimized, repeatedly tested the membrane regeneration method and membrane cleaning experiment , It was finally determined to use the inorganic ceramic membranes to treat banknote printing wastewater , A high permeation flux can be obtained under conditions that , the membrane pore size is 50nm, the operating pressure is 0.3MPa, the membrane surface flow rate is 4.0/s, and the operating temperature is 45~550 ℃.
The simplest and most effective membrane regeneration method is the permeate cleaning method.
And this experiment has good repeatability and stability.

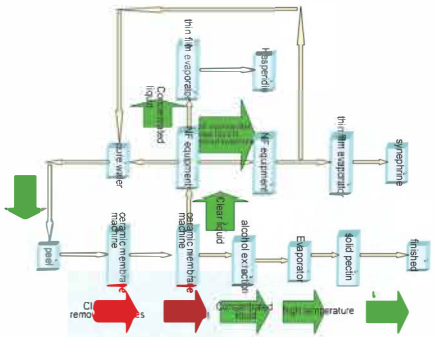
The ceramic membrane separation has the advantages of no phase change, low energy consumption, high efficiency, wide application range, stable operation, and no secondary pollution, there are more and more studies on membrane treatment of banknote printing wastewater. Considering that the wastewater system is highly alkaline (containing about 1% NaOH), and inorganic ceramic membranes have the advantages of acid and alkali resistance, high temperature resistance, long operating life and easy regeneration, inorganic ceramic membranes were chosen to treat banknote printing wastewater.

After the banknote printing wastewater is treated by the inorganic ceramic ultrafiltration membrane, the permeate part is adjusted and recycled. The concentrated liquid part contains a large amount of resins, pigments, fillers and other substances, with a solid content of about 15%. The amount of concentrated liquid produced every day about 12 tons. It is formed into powder through spray drying to make the chalk, turning waste into treasure and meeting the needs of economy and environmental protection.

Pectin is a polymer polysaccharide extracted from citrus and apple pomace, widely used in the food industry mainly as a gelling agent, thickener, emulsifier and stabilizer. All ground plants contain pectin, which together with cellulose maintains the plant's structure. Pectin is a complex high molecular polymer, containing galactose, rhamnose, arabinose, glucose, xylose, mannose, etc. Some pectins also contain a small amount of acetyl groups, but the basic

Currently, the commercial pectin production mainly comes from lemons, citrus and apples, as well as sunflower dishes, beets, etc. When the juice is squeezed, the residue is sent to a pectin manufacturing plant to produce pectin. The traditional process of pectin manufacturing is to extract in the hot water at low pH value, separate the liquid residue and concentrate it, then precipitate it with ethanol, and finally dry and crush it to obtain the finished pectin. Concentration generally uses vacuum concentration or continuous vacuum concentration.
This process consumes high energy, complex operation, high cost. It cannot reduce sugar and low-molecular impurities in the pectin extract. The resulting pectin powder has high impurity content and poor quality.

Our TopU Tech has specially researched an ultrafiltration membrane that can intercept small molecule pectin, and this ultrafiltration and concentration technologies have used in pectin production. Compared with vacuum concentration, membrane separation and concentration technology has no phase change in liquid at room temperature, not only saves energy, but also avoids the decomposition and destruction of active ingredients; it can not only remove most of the water in the pectin extract at room temperature, also remove sugar and oligomers in the pectin extract, and simultaneously achieve decolorization, separation and purification, thereby improving the pectin quality; no need to heat, so no damage to the pectin quality , the operation process is simple and the equipment maintenance is convenient , simplicity



Extracting pectin, synephrine and hesperidin with ceramic membranes

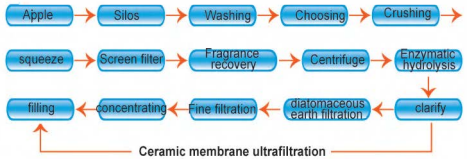
Advantages of ceramic membrane pectin concentration:

1. The ceramic membrane equipment water pump pressure is 3times of the hollow fiber membrane. The membrane tube has a large flux and is not easy to block;
2. The ceramic membrane is made of zirconium oxide, aluminum oxide, and titanium oxide, which is acid and alkali resistant, corrosion resistant, and has a long service life;
3. The pectin retained by the ceramic membrane can reach 90%-100%,
4. Ceramic membrane equipment can separate pectin from water and concentrate it 2-10 times, saving labor and costs.

Application in juice concentration, separation and extraction

Membrane separation technology is now widely used in the clarification of fruit juices (such as apple juice, strawberry juice, grape juice). The organic membrane process will destroy the juice color and taste, while the inorganic microfiltration membranes can not only achieve higher penetration and rejection rate, also can reduce the proteins to absorb on the membrane surface and reduce membrane pollution, In addition, the inorganic membrane has good physical and chemical stability, strong antimicrobial ability, high mechanical strength, high temperature resistance, narrow pore size distribution, and high separation efficiency, long service life , as well as high-pressure backwash and steam online sterilization.

Process route for juice production



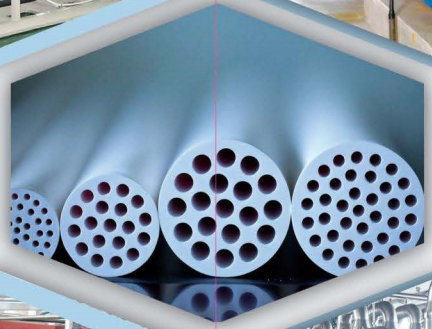
Application scope

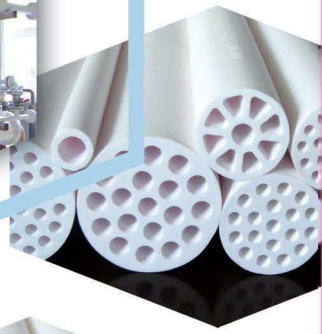
- Microfiltration sterilization of milk
- Concentration of whole milk or pasteurized milk
- Protein normalization
- Whey protein concentrate
- Concentrated yogurt
- Application in bovine colostrum sterilization

Applications in milk processing

The main applications of inorganic ceramic membranes in the milk industry are ultrafiltration and microfiltration membranes. The microfiltration membrane intercepts fat, bacteria, macromolecule casein, permeated milk protein, lactose, salts and other relatively small molecular weight substances. The ultrafiltration membrane retentate contains most of the milk protein and only small molecular substances such as lactose, soluble salts and protein nitrogen can pass through the membrane. The main factors affecting membrane flux during the separation process are concentration polarization and membrane fouling. Membrane fouling not only reduces membrane flux, but also affects the quality of the retentate or permeate. The main components of pollutants are proteins, lipids and calcium salts. Membrane fouling depends to the interaction between feed liquid components and membrane area. Protein adsorption is one of the main factors of membrane fouling. Membrane fouling can be eliminated through chemical cleaning. The acidic cleaning agent usually uses nitric acid (5%) or Phosphoric acid , odium hydroxide (0.1%) are used for alkali cleaning. According to the characteristics of the system, other chemical scavengers such as hydrogen peroxide and sodium hypochlorite are also used for cleaning.


RO SYSTEM





Oily wastewater treatment technology

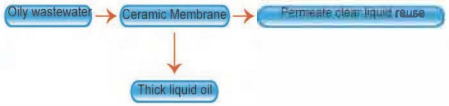
In the production processes of steel rolling, galvanizing, spraying, metal cutting, oil alkali refining, a large amount of oil-containing emulsified wastewater will be produced. These wastewater is difficult to get the ideal treatment results by using general treatment methods such as air flotation, adsorption, biochemical, chemical, etc.

Ceramic membrane oily wastewater treatment equipment has outstanding advantages such as corrosion resistance, high mechanical strength, small footprint, narrow pore size distribution, and long service life. The oily wastewater treatment has stable operation, high flux, good effluent quality, and oil content less than 10ppm. During normal operation, no chemicals and no new sludge. The quality of recovered oil is relatively good.

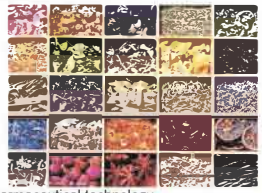
Comparison effect before VS after

Technology for processing cold rolling waste emulsion

1. High oil retention and filtration, the oil content in the output is less than 10ppm, meeting environmental protection requirements:
2. Resistant to acid, alkali and oxidizing substances, resistant to microbial erosion, long service life
3. PLC automatic control can be realized, with low labor intensity and saving labor costs:
4. No need to use expensive demulsifiers and flocculants, low operating costs
5. Using cross-flow filtration, it is resistant to pollution and can maintain high throughput:
6. Long time membrane cleaning cycle, stable cleaning flux recovery effect.
7. Few wearing parts, simple equipment maintenance and low maintenance costs:
8. A large amount of valuable oil can be recovered after concentration.



Clarification Technology of Traditional Chinese Medicine Extracts



The chemical components of traditional Chinese medicine are very complex, usually including sugars, amino acids, proteins, oils, waxes, enzymes, pigments, vitamins, organic acids, tannins, inorganic salts, volatile oils, alkaloids, etc. These ingredients include both active ingredients and ineffective impurities. If the impurities are not removed as much as possible, the quality and stability of the medicine will be affected. The main reasons for the redundancy and low clarity that the medicinal liquid contains tannins, proteins and macromolecular substances. The production methods of traditional Chinese medicine, such as decoction, alcohol precipitation, filtration, and concentration, are still in use today. They have exposed many shortcomings and defects, no longer adapt to the development of modern pharmaceutical technology .

Many traditional Chinese medicine companies have tried to use hollow fiber membrane filtration to replace the alcohol precipitation process. However, due to the membrane material, organic ultrafiltration and microfiltration membranes suffer from rapid flux attenuation and incomplete membrane cleaning and regeneration , short service life .

The inorganic ceramic membranes makes up for the shortcomings of traditional alcohol precipitation methods and organic membrane separation methods. it can filter out macromolecular substances such as proteins, starch, pectin, tannins and microorganisms, while the active ingredients are basically not retained;

The integrated membrane separation process based on inorganic ceramic membrane separation technolog. following advantages:

No pollution, no residue, it is a green and environmentally friendly technology;

The filtration process only uses pressure as the driving force for membrane separation. Simple separation device and operation, and the process parameters are easy to control

Simplified process , greatly shortened production cycle :

The membrane process does not change and does not require heating, which greatly saves energy consumption;

The filtration precision is very high, low impurity content, the ingredients of the original formula are maintained and the content of active ingredients is increased:

Ceramic membranes have high pollution resistance, low requirements for liquid pretreatment, and high-throughput filtration for a long time:

The membrane pores are rigid and the material is inert, resistant to polar organic solvents and not easy to corrode and deform.

It can be cleaned with pH 0~14 strong acid and alkali oxidizing reagents, and the ceramic membrane elements can be thoroughly cleaned and regenerated. The service life is 5~10 times that of organic membrane .

Ceramic membrane elements are resistant to high temperatures and can be sterilized by steam and oxidants;

Greatly reduced the ethanol used during production. Reduce explosion-proof requirements and improve operating environment and production safety;

It changes the problem that the pharmaceutical liquid is often more viscous and difficult to concentrate, ensuring that the liquid preparation is not easy to sediment or wall sticking during storage;

Greatly reduced the content of impurity proteins, tannins, and pectin, thereby reducing membrane pollution, increasing flux, and extending the cleaning cycle and service life;

PLC upper computer control ensures reliable operation and greatly reduces labor intensity.

Integrated membrane separation process

Ceramic membrane extraction process

Tea Beverage Clarification Technology

The turbidity problem of tea beverages is one of the technical problems. it's related to thecomplex flocculation between tea polyphenols, caffeine, soluble protein, pectin and other substances in the tea soup. Traditional separation and extraction methods mainly use mechanical filtration, high-speed centrifugation and chemical treatment, etc., with poor clarification effect and poor product quality.

Integrated inorganic ceramic membrane separation technology solves these problems:
Macromolecule protein pectin are removed by the ceramic ultrafiltration membrane while tea polyphenols, caffeine, amino acids, catechins and other active ingredients are obtained , and ensure the flavor and stability of tea beverages: at the same time, the clarified tea juice is concentrated by reverse osmosis membrane, the active ingredients to maximize retention, replacing the traditional evaporation concentration process.

Process technology characteristics:

High filtration precision , clarity and stability, and solves the "turbidity after cold" phenomenon.
Less loss of active ingredients such as tea polyphenols, caffeine, and amino acids, and the product purity is improved;
No need to add chemicals, no pollution, no residue, green and environmentally friendly technology;
Compared with organic ultrafiltration membranes, ceramic membrane ultrafiltration membranes can be cleaned with pH O-14 strong acid and alkali oxidizing reagent, which can be thoroughly cleaned and regenerated, have a long service life;
The ceramic membrane has high pollution resistance, has low requirements for tea juice pretreatment, and can maintain high-flux filtration for a long time;
Ceramic membrane elements are resistant to high temperatures and can be sterilized by steam and oxidants;
The content of impurity proteins, tannins, and pectin is greatly reduced, thereby reducing membrane pollution during subsequent reverse osmosis membrane concentration, increasing flux, and extending the cleaning cycle and service life;
The membrane pore size is asymmetrically distributed and can be backwashed online;
PLC upper computer control, reliable operation, greatly reducing labor intensity and low maintenance costs:
The supporting reverse osmosis concentration process is a phase-change-free process at room temperature, which

Tea deep processing

Tea polyphenols, instant tea, extraction of other functional active ingredients in tea, comprehensive utilization of tea scraps, black tea beverages, green tea beverages, oolong tea beverages, scented tea beverages, tea foods, tea beverages

Nanopowder washing and purification technology

In the process of producing nano-ultrafine powder by wet chemical method, it is necessary to repeatedly wash the ultrafine product slurry to remove impurity ions and improve product purity. For some powders with good dispersion and nanometer particle size System, traditional plate and frame filtration, high-speed centrifugation and other washing methods cannot effectively separate solid-liquid. There are shortcomings such as easy powder leakage, filtrate turbidity, large washing water volume, and high labor intensity.

As a new type of solid-liquid separation element, inorganic microporous ceramic membrane has the advantages of high separation accuracy, good wear resistance, stable operation, etc. It uses "cross-flow filtration" technology: ultra-fine powder slurry is dispersed in the ceramic membrane The ultra-precise membrane layer (filtration pore size 1nm-200nm) can completely retain ultra-fine powder particles, and at the same time, the aqueous solution containing impurity ions seeps out through the membrane pores. During this process, pure water is added to filter and wash repeatedly. It can greatly remove impurity ions, thereby improving the purity of the final product.

Process characteristics

- Extremely high filtration precision, the minimum filtration pore size can reach 1nm;
- The interception rate of ultra-fine powder is high, and there is almost no loss of precious powder and no material leakage;
- Good cleaning effect and low impurity content, and can make ultra-fine powder with extremely high purity;
- Concentrated water is clear and transparent, no particles, pollution-free;
- Small washing volume, which can save more than 30% of washing water;
- The process parameters of the washing process can be controlled, which helps to improve the dispersion of the powder.
- The filtration process only uses pressure as the driving force for membrane separation, and simple separation device and easy to operate;
- Can be fully automated controlled by PLC, low labor intensity.
- It can be equipped with reverse osmosis equipment to make the pure water, and the total operating cost is low;

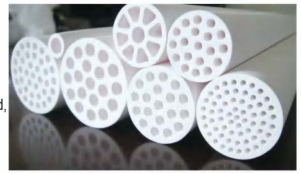
Applications Range:

- Cleaning of nano-titanium oxide, zinc oxide, aluminum chloride and other oxides
- Washing of Nano inorganic salt such as nanobarium titanate and barium carbonate;
- Washing of nanodiamond, silver powder, etc;
- Washing of nano-kaolin, montmorillonite and other minerals
- Nanomedicine washing
- Washing of nano titanium silicon molecular sieve
- Washing and interception of nanocatalysts

Ceramic membrane separation technology used for Catalyst return agent:

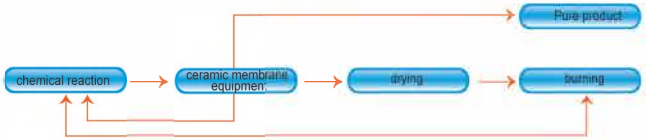
Different from traditional sedimentation, plate and frame filtration, and centrifugal separation, ceramic membranes mainly use cross-flow filtration in solid-liquid separation. The feed liquid that needs to be separated is continuously circulated on the circulation side. The membrane surface can intercept the catalyst and at the same time allow the anti-silence reaction products to seep out through the membrane pores. Since the fluid flow is parallel to the surface of the filter medium, the filtration resistance is greatly reduced, so that a relatively large penetration capacity can be maintained at a lower pressure. The filtration operation can be carried out continuously over a longer period of time, so that the catalyst in the concentrated solution can content reaches a high level.

Advantages of application in catalyst addition and regeneration



1. Recyclable ultrafine powder and nanocatalysts;
2. Ceramic membranes can withstand high temperatures, organic solvents, strong acids and alkalis, and can be used in most reactions;
3. Low catalyst loss rate, reduced the production cost;
4. Good catalyst regeneration effect, the number of reuses is increased, and the catalyst life is extended.
5. Fully enclosed automated continuous production can be achieved.

Schematic diagram of catalyst recovery



Ceramic membrane filters are used in the primary brine process to filter magnesium hydroxide, calcium carbonate and other insoluble impurities, It can replace the Doyle barrel and sand filter , or replace the floating clarification barrel and Gore membrane filter.

The process: Sodium carbonate and sodium hydroxide are added to the saturated brine， then enter the reaction barrel. it enters the crude brine circulation tank after full reaction, then transported to the ceramic membrane filter with a pump (the flow rate is 2.5 times the amount of brine used). The filtration pressure is greater than 0.4MPa. The crude brine is gradually filtered through three stages. It is concentrated to 60% of the original flow rate, and then sent to a chamber filter press to filter out the salt mud, and the filtrate returns to the crude brine circulation tank. The brine filtered out by the ceramic membrane filter is refined brine. The solid content of the quality index can reach 0.5ppm. Its content cannot be determined by chemical analysis, which fully meets the requirements of ion membrane brine. The filtration device is also equipped with a timed backwash pipeline and an acid washing system to remove accumulated calcium and magnesium precipitates on the surface of the ceramic membrane.

Compared with the traditional Doyle barrel process and the new floating barrel plus Gore membrane filter process, ceramic membrane filters have the advantages of less space, less equipment, and simple installation. In terms of brine quality, only the floating Gore membrane filter capsule process can be compared with each other. The Gore membrane filter process equipment is huge and the operation is complex. Ceramic membrane filters are relatively simple to operate.

Application of ceramic membrane in oil field reinjection water

Water treatment in oil fields is an important part. This process includes all water quality improvement processes to provide pressurized water injection in oil storage formations. Traditional oily wastewater treatment methods cannot meet specific standard requirements, and ceramic membranes play an important role in the treatment

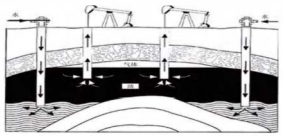
In the treatment of oily wastewater, ceramic membranes perform particularly well.
First , hydrophilic and oleophobic properties of ceramic membrane materials, which can prevent and control the pollution of organic substances;

Secondly, because ceramic membrane materials have good chemical stability, don't like the organic membranes and organic filter materials to absorb oil cause denaturation and destruction of the filter material, and it can be cleaned and regenerated with cleaning agents such as strong acid, strong alkali, and strong redox agents;

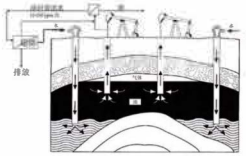
Third, the ceramic membrane has high mechanical strength and can be used and cleaned under high temperature and high pressure;

Fourth, Good and stable water quality is produced by ceramic membrane, which fully meets the water quality requirements for water injection in low-permeability oil layers.

At present, the application scope of TopU Tech ceramic membranes has been successfully expanded to the metal degreasing liquid treatment, cold rolling oily wastewater treatment, electrocatalysis oxidation wastewater treatment, garbage leachate treatment, etc.



Traditional oilfield wastewater treatment methods



Ceramic membranes oilfield effluent treatment

Application of ceramic membrane in xylitol separation and concentration

D-xylose is a five-carbon sugar obtained by hydrolysis of hemicellulose-rich plants such as sawdust, rice straw, and corn cobs. It is easily soluble in hot ethanol and pyrimidine, and its sweetness is 67% of sucrose. Xylose has similar chemical properties to glucose and can be reduced to the corresponding alcohol.
The inorganic ceramic membrane can remove impurities and improve light transmission, and improve the purity of the sugar. The nanofiltration membrane concentrates and separates xylose and water, thereby reducing the pressure of subsequent procedures and reducing the amount of steam, which is environmentally friendly and saves energy. The clear liquid from the nanofiltration membrane can be directly reused in the first process. The inorganic membrane itself has the advantages of good stability, strong antimicrobial resistance, high temperature resistance, narrow pore size distribution, and long service life, so it is widely used in the sugar industry.