Water Treatment Method of Environmental Engineering Based on Ultrafiltration Membrane Technology

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Abstract: Traditional water treatment technology of environmental engineering can only precipitate the larger particles of impurities, or only remove the odor, but in fact some small particles will still exist in the water, which will bring some hidden dangers to people's water safety. Ultrafiltration membrane technology is a type of water treatment technology in which the solvent and small molecular weight solute in the solution can use the micropores on the membrane to enter the other side of the membrane, while some macromolecular solutes and harmful substances cannot enter the micropores and is blocked by the ultrafiltration membrane when the pressure is applied, and finally the raw water is purified; this technology not only can separate the particulate matter and the colloid, but also can separate the aquatic organisms and bacteria to a certain extent, and thus has been widely used in the fields of water treatment. On the basis of summarizing and analyzing the previous research results, this paper expounds the basic principles, functional characteristics, existing deficiencies and corresponding solutions of ultrafiltration membrane technology, and proposes an water treatment method and their applications of environmental engineering based on ultrafiltration membrane technology. The study results of this paper provide a reference for further research on water treatment methods of environmental engineering based on ultrafiltration membrane technology.

1. Introduction

In the past, traditional water treatment technology generally pretreated the water resources, that is, put in the disinfectant or special purifying agent for water resources, removed the suspended solids in the water, and at the same time, removed the odor in the water, and after the purification was completed, the water was transported to the water pipe. In this procedure, it is easy to cause secondary pollution of water resources, and the use of disinfectants and purifiers will also bring some problems to water quality, so the traditional water treatment technology will gradually be eliminated. Membrane treatment technology is a physical treatment technology that filters and separates some harmful substances contained in water from sewage. Ultrafiltration membrane technology is a widely used technique in water treatment. It means that the solvent and small molecular weight solute in the solution can use the micropores on the membrane to enter the other side of the membrane, while some macromolecular solutes and harmful substances cannot enter the micropores and is blocked by the ultrafiltration membrane when the pressure is applied, and finally the raw water is purified. Ultrafiltration membrane technology not only filters impurities and particulate matter, but also filters algae and harmful substances in water, so it has received a high degree of attention in water treatment environment engineering [1].

Ultrafiltration membrane technology also has some drawbacks, such as the lack of a perfect combination of ultrafiltration membrane treatment technology, the consumption of certain energy sources and the formation of pollution problems. The capacity of the raw water through the ultrafiltration membrane increases the energy consumption, resulting in an increase in the production cost of the elite water. If ultrafiltration membrane fouling occurs, it will seriously affect the utilization rate of ultrafiltration membrane technology in water treatment. Once the pollution level is large, chemical agents must be used to purify the ultrafiltration membrane. When the membrane technology is used for filtration, it is necessary to give sufficient pressure to push the impurities to the filter membrane. Therefore, good driving equipment is indispensable, but the

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operation of the driving equipment is undoubtedly complicated by the sewage treatment process, which increases the cost of sewage treatment [2]. In addition, the filtration operation of heavy metal wastewater is more difficult. In the application of ultrafiltration membrane technology, in addition to dealing with chemical problems, it is also necessary to effectively identify and test metal ions.

On the basis of summarizing and analyzing the previous research results, this paper expounds the basic principles, functional characteristics, existing deficiencies and corresponding solutions of ultrafiltration membrane technology, and proposes an water treatment method and their applications of environmental engineering based on ultrafiltration membrane technology; the study results of this paper provide a reference for further research on water treatment methods of environmental engineering based on ultrafiltration membrane technology. The detailed chapters are organized as follows: Section 2 introduces the principles and characteristics of ultrafiltration membrane technology; Section 3 proposes water treatment methods and applications of environmental engineering based on ultrafiltration membrane technology; and Section 4 is conclusion.

2. Principle and Characteristics of Ultrafiltration Membrane Technology

The essence of ultrafiltration membrane technology is filtration. Compared with traditional filtration technology, such as filter paper filtration, this technology is simpler to operate and has higher precision and is a very effective filtration method. The principle of ultrafiltration is mainly to work through the external, so as to effectively promote the promotion of raw water. Under the effect of the characteristics of the ultrafiltration membrane, a certain pressure difference will occur inside and outside the membrane. At this time, the raw water will gradually penetrate under the influence of pressure. After passing through the ultrafiltration membrane medium, passive selection is carried out, and finally the water body will block bacteria, gravel, and so on, and clean water will flow out from the other side. Ultrafiltration membrane technology is micro-transparent and slightly permeable. Generally, the molecular weight that can be retained by this technique is 500 to 500,000, and the diameter of the molecule is 0.002-0.100 μm. Ultrafiltration membrane technology not only filters out impurities and particulate matter like traditional water treatment technology, but also filters algae, viruses, aquatic organisms in water, and has good filtration effect. Therefore, it is widely used in water treatment, sewage treatment and recovery, oily wastewater and in environmental engineering water treatment such as recycling, papermaking wastewater recovery and seawater desalination [3].

Different from the general processing technology, the ultrafiltration membrane technology has stronger classification and materialization functions. From the point of view of materialization, it is relatively chemically sTable, and its resistance to high temperature is also very sTable; its temperature tolerance reaches about 140 ℃, and it can achieve sterilization and anti-virus by high temperature [4]. The pH range of the ultrafiltration membrane is also relatively long, and it can be applied to a variety of liquids with strong acidity or strong alkalinity, so the treatment efficiency is higher and the degree of purification is higher. The ultrafiltration technology has the following characteristics: it does not undergo any qualitative change during the ultrafiltration process, and can be stably operated at normal temperature; the device has a compact structure, a small footprint, and is easy to operate; the ultrafiltration separation process is simple, and the equipment is highly automated; It can classify different molecular weight substances; it has strong applicability to water quality and wide application range (Figure 1).

Short-flow technology is one of the more effective and widely used technologies in ultrafiltration membrane technology. The principle is to combine multiple water purification technologies and membrane treatment technologies to use a comprehensive process for comprehensive treatment of water treatment. The use of this water treatment scheme has certain limitations: it is necessary to select a zone with good water quality. The water pollution level should not be too high; otherwise the water treatment cannot be completed. The advantage of this water treatment technology is to save material resources. It is not necessary to find a large-scale water treatment plant for treatment. As long as the traditional waterworks in the past is slightly modified, it can be used directly. Most of the short-flow technology is only applied to small water-contaminated areas, but the

ultrafiltration membrane treatment technology is effective in short-flow technology and is widely used. This technology can make a variety of water purification technology and ultrafiltration membrane technology have a small application, which can make the water purification effect better, and save manpower and material resources. However, it has certain limitations in the treatment of water environment, and can only be applied in areas with good water quality and water pollution, or it can not achieve the purpose of water purification.

The double membrane treatment technology mainly completes the treatment of water through the double-layer ultrafiltration membrane of the street, or effectively combines the reverse osmosis membrane and the ultrafiltration membrane in the water treatment process to improve the water treatment effect. This technology can be applied to areas with serious water pollution, and the water treatment effect is excellent. The traditional water treatment technology is difficult to deal with waters with more serious pollution or waters with large salt content, and it is difficult to achieve pollution treatment by means of disinfectants and purifiers. Double membrane treatment technology can achieve double purification of water resources, so that the quality of water after treatment is guaranteed. The double membrane treatment technology is applied to areas with serious water pollution, or areas with high salt content in water. With the double membrane treatment technology, it is not necessary to carry out the allocation of water resources in other regions. To save manpower and material resources, reduce water pollution treatment costs.

3. Water Treatment Method and Its Application in Environmental Engineering Based on Ultrafiltration Membrane Technology

As a new type of water treatment technology, ultrafiltration membrane technology meets the purification standards of drinking water in water pollution treatment, which has been recognized by the industry and related parties, and has gradually gained a large scale applications in the field of purified drinking water. The drinking water purification process is: tap water first enters the ultrafiltration membrane product tube; under the action of water pressure difference, the micropores on the membrane surface only pass water molecules, beneficial minerals and trace elements, etc., which promotes the conversion of tap water into purified water; the harmful substances such as bacteria, rust, colloid, sediment, suspended solids and macromolecular organic substances contained in the tap water will be trapped in the ultrafiltration membrane tube, and in the subsequent ultrafiltration membrane flushing, it can be discharged outside the tube, and complete the purification of tap water. However, it should be noted here that once the tap water is seriously polluted, the ultrafiltration membrane is used for a long time, which may cause serious clogging of the membrane. Therefore, the relevant staff needs to regularly rinse the ultrafiltration membrane to ensure the water production of the membrane [5]. Environmental applications of ultrafiltration membrane technology in water treatment method are shown in Figure 1.

With the development of industrialized cities, the problem of water pollution has threatened the safety of human life and the construction of urban civilization. The pollution degree of urban domestic sewage is relatively light, and the effective filtration of urban domestic sewage can effectively alleviate the shortage of water resources. The use of ultrafiltration membrane technology in urban domestic sewage can achieve effective recycling of sewage. Ultrafiltration membrane filtration technology can be used to scientifically and effectively treat common urban sewage such as domestic sewage, sewage, and surface water. In addition, the use of ultrafiltration membrane technology can effectively remove substances that endanger people's health in urban sewage, such as viruses, microorganisms, etc., so that the urban sewage after filtration treatment meets the prescribed discharge standards, and then further treatment by the waterworks. It can be used as a resident's domestic water again, so as to achieve a good water cycle and realize the reuse of water resources.

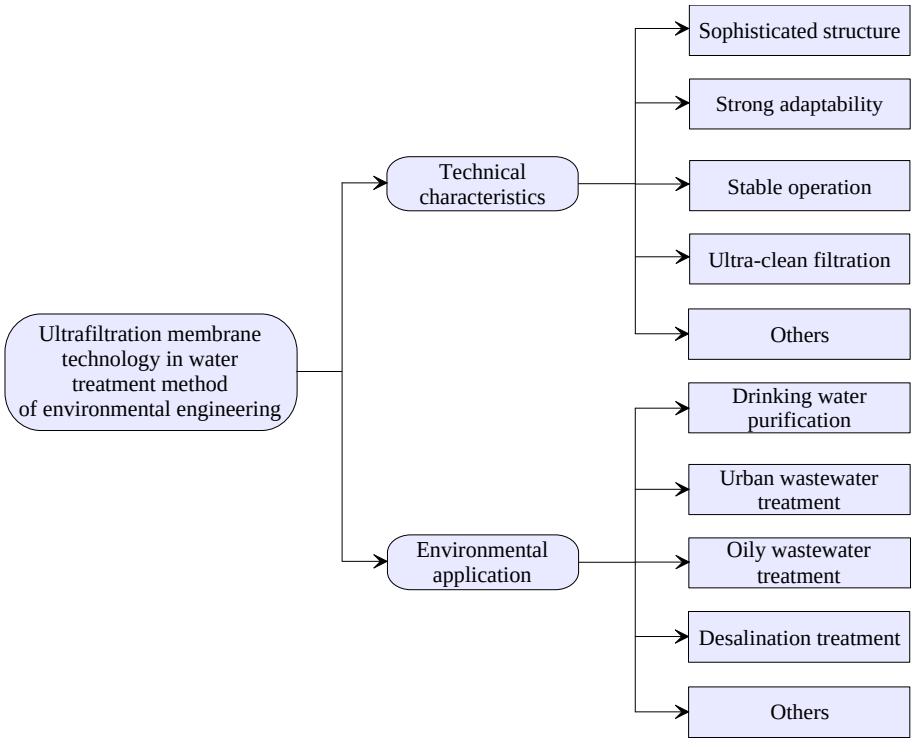

Figure 1 Technical characteristics and environmental applications of ultrafiltration membrane technology in water treatment method of environmental engineering

In order to alleviate the current shortage of freshwater resources, most countries have begun to desalinate seawater. Although the use of electro osmosis technology can achieve good results in seawater desalination, the water recovery rate is very low, and the energy consumption of this method is more serious. The rational use of reverse osmosis technology can not only effectively guarantee the salt rejection rate, but also reduce energy consumption and cost, and achieve high social and economic benefits. With the further study of reverse osmosis technology, ultrafiltration membrane technology has achieved good application in the process of seawater desalination. Due to its high physicochemical properties and separation performance, it can be scientific when desalinating seawater. The water quality of the water in the reverse osmosis system is controlled reasonably, so that the seawater desalination water quality is guaranteed.

Under normal circumstances, there are three main types of oily sewage: oily floating on the surface of the water, oil and water mixed, oily emulsifier for sewage. Different treatments of oily wastewater have different treatment processes. The oil slick and the dispersed oil are easier to handle, and the mechanical and physical methods are used for coagulation and sedimentation, and the oil and water are separated by the ultrafiltration membrane and the activated carbon adsorption to minimize the oil content in the water. However, in the case of oily emulsifiers, the use of physical methods for filtration and activated carbon adsorption does not achieve the desired effect. Therefore, ultrafiltration membrane technology is needed to isolate oily molecules on one side for centralized treatment and analysis of oleaginous molecules. The oxides in the process are formulated with special treatment schemes to ensure the reliability and high efficiency of oily wastewater treatment.

4. Conclusions

On the basis of summarizing and analyzing the previous research results, this paper expounds the basic principles, functional characteristics, existing deficiencies and corresponding solutions of ultrafiltration membrane technology, and proposes an water treatment method and their applications of environmental engineering based on ultrafiltration membrane technology. Ultrafiltration membrane technology is a type of water treatment technology in which the solvent and small molecular weight solute in the solution can use the micropores on the membrane to enter the other side of the membrane, while some macromolecular solutes and harmful substances cannot enter the

micropores and is blocked by the ultrafiltration membrane when the pressure is applied, and finally the raw water is purified. This technology not only can separate the particulate matter and the colloid, but also can separate the aquatic organisms and the bacteria to a certain extent, and thus has been widely used in the field of water treatment. Ultrafiltration membrane technology also has some drawbacks, such as the lack of a perfect combination of ultrafiltration membrane treatment technology, the consumption of certain energy sources and the formation of pollution problems. The ultrafiltration technology has the following characteristics: it does not undergo any qualitative change during the ultrafiltration process, and can be stably operated at normal temperature; the device has a compact structure, a small footprint, and is easy to operate; the ultrafiltration separation process is simple, and the equipment is highly automated; It can classify different molecular weight substances; it has strong applicability to water quality and wide application range. Ultrafiltration membrane water treatment technology has important applications in drinking water purification, urban sewage treatment, seawater desalination and oily wastewater treatment.

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