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# Analysis of the Causes of Fouling in Ceramic Ultrafiltration Membrane in the Heating Network Water Supplement Treatment System of Thermal Power Plants

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## Introduction

The pore size of ultrafiltration membranes ranges from 20 to 50 nm, which is small enough to remove most particles and colloids. Additionally, they only require low driving pressures to effectively ensure the safety of the treated water. However, the narrow pore size can trap or adsorb macromolecular pollutants in the solution, and the ultrafiltration membranes can react with pollutants in the water, leading to reduced pore sizes, blockages, or even damage to the membrane structure. This results in decreased permeation flux, severely hindering the advancement of membrane technology and the development of the membrane industry. Membrane fouling has now become a major issue restricting the application of ultrafiltration technology in human life. Therefore, finding effective solutions to the problem of membrane fouling is of significant importance.

## Issues in the Actual Operation of Ultrafiltration Membranes

List of operational data

## Analysis of Actual Operation Issues of Ultrafiltration Membranes

Analyze from seven aspects combined with actual operation

# Solutions to Actual Ultrafiltration Membrane Fouling Issues

The analysis of the actual fouling problems of ultrafiltration membranes indicates that issues one to four are related to pre-treatment, issue five pertains to valve material problems requiring material replacement, and issues six and seven involve design considerations that need to be revised. Below are solutions proposed in three areas addressing the above issues.

Method 1  
Pre-treatment  
Technology to  
Control  
Ultrafiltration  
Membrane Fouling

Method 2  
Replace valve  
material to control  
ultrafiltration  
membrane fouling

Method 3  
Change the  
imperfect design  
to control the  
blockage of the  
ultrafiltration  
membrane

## Conclusion

According to the actual situation, the whole system was modified and summarized as follows:

1) The pretreatment section was adjusted, the pH value was adjusted to 7.5, the PAC dosage was corrected as adjusted to 5mg/L, and the GT value of the coagulation and stirring was controlled to 50000. 2) The valve material at the final alkali dosing point was changed to 316 stainless steel, and the valve material at the acid dosing point was changed to Hastelloy B. 3) During the chemical cleaning of the ultrafiltration system, the water return pipe and the concentrated water return pipe were designed separately, a pressure gauge was added to the concentrated water return section of the ultrafiltration frame, and a sampling valve was set on the backwash upper discharge pipe of the ultrafiltration frame.

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