CLAIMS

1. A control method for a filtration membrane system comprising a coagulant injection unit configured to inject a coagulant into raw water, and a filtration membrane configured to obtain filtrate by filtration treatment of coagulation-treated water of the raw water containing aggregates formed by injection of the coagulant,

wherein the filtration membrane is an alumina-based ceramic membrane that is positively charged in the coagulation-treated water having a pH of 5 to 8,

the control method comprising a control step of controlling injection rates of at least one of the coagulant and a pH adjusting agent so that the zeta potential of the aggregates falls within a target range corresponding to the material of the filtration membrane, as preprocessing before the filtration treatment by the filtration membrane, and

wherein in the control step, the injection rate of at least one of the coagulant and the pH adjusting agent is controlled so that the zeta potential of the aggregates is -7 mV or higher and the zeta potential falls within a negative-side region of the target range.

2. The control method for a filtration membrane system according to claim 1, further comprising a preparation step of acquiring a correspondence relationship between the pH values of the coagulation-treated water and the zeta potential of the aggregates,

wherein in the control step, the pH values of the coagulation-treated water are monitored, and injection rates of at least one of the coagulant and the pH adjusting agent are controlled so that the monitored pH values of the coagulation-treated water fall within a pH value range corresponding to the target range, based on the correspondence relationship.

3. The control method for a filtration membrane system according to claim 1 or claim 2, wherein in the control step, the pH adjusting agent is injected into the raw water at a predetermined ratio, and the injection rate of the coagulant is controlled so that the zeta potential of the aggregates falls within a target range corresponding to the material of the filtration membrane.

4. The control method for a filtration membrane system according to claim 1 or claim 2, wherein in the control step, the coagulant is injected into the raw water at a predetermined ratio, and the injection rate of the pH adjusting agent is controlled so that the zeta potential of the aggregates falls within a target range corresponding to the material of the filtration membrane.

5. The control method for a filtration membrane system according to claim 1 or claim 2, wherein the filtration membrane system further comprises a sedimentation tank configured to perform solid-liquid separation of the aggregates upstream of the filtration membrane, and the filtration membrane is configured to perform filtration treatment of the coagulation-treated water after the solid-liquid separation.

6. A control apparatus for a filtration membrane system comprising a coagulant injection unit configured to inject a coagulant into raw water, and a filtration membrane configured to obtain filtrate by filtration treatment of coagulation-treated water of the raw water containing aggregates formed by injection of the coagulant,

wherein the filtration membrane is an alumina-based ceramic membrane that is positively charged in the coagulation-treated water having a pH of 5 to 8,

the control apparatus comprising a control unit configured to adjust injection rates

of at least one of the coagulant and a pH adjusting agent so that the zeta potential of the aggregates falls within a target range corresponding to the material of the filtration membrane, upstream of filtration treatment by the filtration membrane, and

wherein the control unit controls the injection rate of at least one of the coagulant and the pH adjusting agent so that the zeta potential of the aggregates is -7 mV or higher and the zeta potential falls within a negative-side region of the target range.

7. The control apparatus according to claim 6, further comprising a storage unit configured to hold data of correspondence relationship between the pH values of the coagulation-treated water and the zeta potential of the aggregates, wherein the control unit acquires the pH values of the coagulation-treated water, and controls the injection rate of at least one of the coagulant and the pH adjusting agent so that the pH values of the coagulation-treated water fall within a pH value range corresponding to the target range, based on the correspondence relationship.

8. A filtration membrane system comprising:

a coagulant injection unit configured to inject a coagulant into raw water,

a filtration membrane configured to obtain filtrate by filtration treatment of coagulation-treated water of the raw water containing aggregates formed by injection of the coagulant, and

a control apparatus according to claim 6 or claim 7.