CLAIMS

[Claim 1]

A method for treating wastewater containing a cationic surfactant, the method comprising:

a first reverse-osmosis-membrane-separation step in which a pH of wastewater containing a cationic surfactant is controlled to be 3 to 5 and the wastewater containing a cationic surfactant is subsequently subjected to a reverse-osmosis-membrane-separation treatment; and

a second reverse-osmosis-membrane-separation step in which a pH of reverse-osmosis-membrane permeate water produced in the first reverse-osmosis-membrane-separation step is controlled to be 6.5 to 10.5 and the reverse-osmosis-membrane permeate water is subsequently subjected to a reverse-osmosis-membrane-separation treatment.

[Claim 2]

The method for treating wastewater containing a cationic surfactant according to Claim 1, wherein the wastewater containing a cationic surfactant is subjected to an activated-carbon treatment prior to being treated in the first reverse-osmosis-membrane-separation step.

[Claim 3]

The method for treating wastewater containing a cationic surfactant according to Claim 2, wherein the wastewater containing a cationic surfactant is subjected to an SS-removal treatment prior to being subjected to the

activated-carbon treatment.

[Claim 4]

The method for treating wastewater containing a cationic surfactant according to any one of Claims 1 to 3, wherein the wastewater containing a cationic surfactant is wastewater from an electronic industry process, and wherein reverse-osmosis-membrane permeate water produced in the second reverse-osmosis-membrane-separation step is recovered.

[Claim 5]

An apparatus for treating wastewater containing a cationic surfactant, the apparatus comprising:

a first reverse-osmosis-membrane-separation device for controlling a pH of wastewater containing a cationic surfactant to be 3 to 5 and subsequently subjecting the wastewater containing a cationic surfactant to a reverse-osmosis-membrane-separation treatment; and

a second reverse-osmosis-membrane-separation device for controlling a pH of reverse-osmosis-membrane permeate water produced by the first reverse-osmosis-membrane-separation means to be 6.5 to 10.5 and subsequently subjecting the reverse-osmosis-membrane permeate water to a reverse-osmosis-membrane-separation treatment.

[Claim 6]

The apparatus for treating wastewater containing a cationic surfactant according to Claim 5, the apparatus comprising an activated carbon column in which the

wastewater containing a cationic surfactant is treated, the activated carbon column being disposed upstream of the first reverse-osmosis-membrane-separation device.

[Claim 7]

The apparatus for treating wastewater containing a cationic surfactant according to Claim 6, the apparatus comprising an SS-remover for removing SS in the wastewater containing a cationic surfactant to an SS-removal treatment, the SS-remover being disposed upstream of the activated carbon column.

[Claim 8]

The apparatus for treating wastewater containing a cationic surfactant according to any one of Claims 5 to 7, wherein the wastewater containing a cationic surfactant is wastewater from an electronic industry process, and wherein reverse-osmosis-membrane permeate water produced by the second reverse-osmosis-membrane-separation device is recovered.

Claims

[Claim 1]

A method for treating wastewater containing a cationic surfactant, the method comprising:

a first reverse-osmosis-membrane-separation step in which a pH of wastewater containing a cationic surfactant is controlled to be 3 to 5 and the wastewater containing a cationic surfactant is subsequently subjected to a reverse-osmosis-membrane-separation treatment; and

a second reverse-osmosis-membrane-separation step in which a pH of reverse-osmosis-membrane permeate water produced in the first reverse-osmosis-membrane-separation step is controlled to be 6.5 to 10.5 and the reverse-osmosis-membrane permeate water is subsequently subjected to a reverse-osmosis-membrane-separation treatment,

wherein the wastewater containing a cationic surfactant is wastewater from an electronic industry process,

wherein the reverse-osmosis-membrane in the first reverse-osmosis-membrane-separation step is a polyamide membrane or a polyvinyl alcohol membrane,

wherein a water recovery percentage of the first reverse-osmosis-membrane-separation step is set to 60% to 90%,

wherein the reverse osmosis membrane in the second reverse-osmosis-membrane-separation step is a polyamide membrane,

wherein a water recovery percentage of the second reverse-osmosis-membrane-separation step is set to 80% to 90%, and

wherein reverse-osmosis-membrane permeate water produced in the second reverse-osmosis-membrane-separation step is recovered.

[Claim 2]

The method for treating wastewater containing a cationic surfactant

according to Claim 1, wherein the wastewater containing a cationic surfactant is subjected to an activated-carbon treatment prior to being treated in the first reverse-osmosis-membrane-separation step.

[Claim 3]

An apparatus for treating wastewater containing a cationic surfactant, the apparatus comprising:

a first reverse-osmosis-membrane-separation device for controlling a pH of wastewater containing a cationic surfactant to be 3 to 5 and subsequently subjecting the wastewater containing a cationic surfactant to a reverse-osmosis-membrane-separation treatment; and

a second reverse-osmosis-membrane-separation device for controlling a pH of reverse-osmosis-membrane permeate water produced by the first reverse-osmosis-membrane-separation means to be 6.5 to 10.5 and subsequently subjecting the reverse-osmosis-membrane permeate water to a reverse-osmosis-membrane-separation treatment,

wherein the wastewater containing a cationic surfactant is wastewater from an electronic industry process,

wherein the reverse osmosis membrane included in the first reverse-osmosis-membrane-separation device is a polyamide membrane or a polyvinyl alcohol membrane,

wherein a water recovery percentage of the first reverse-osmosis-membrane-separation device is set to 60% to 90%,

wherein the reverse osmosis membrane in the second reverse-osmosis-membrane-separation device is a polyamide membrane,

wherein the water recovery percentage of the second reverse-osmosis-membrane-separation device is set to 80% to 90%, and

wherein reverse-osmosis-membrane permeate water produced by the second reverse-osmosis-membrane-separation device is recovered.

[Claim 4]

The apparatus for treating wastewater containing a cationic surfactant

according to Claim 3, the apparatus comprising an activated carbon column in which the wastewater containing a cationic surfactant is treated, the activated carbon column being disposed upstream of the first reverse-osmosis-membrane-separation device.