DESCRIPTION

Title of Invention: SOLID CHEMICAL AGENT HOUSING BODY AND WATER TREATMENT METHOD

Technical Field

[0001]

The present invention relates to a solid chemical housing body housing a water-soluble solid chemical. More specifically, the present invention relates to a solid chemical housing body which serves to continuously release its active substance into water to be treated, with the water-soluble solid chemical gradually dissolving by contact with the water to be treated, and a water treatment method for performing water treatment by using the solid chemical housing body.

Background Art

[0002]

As a technique for continuously releasing active substances into water to be treated, with a solid chemical having water solubility (hereinafter referred to as the water-soluble solid chemical) gradually dissolving, a technique is disclosed, in which a solid chemical dissolving apparatus includes an inner cylindrical body and an outer cylindrical body, and the rotation of the inner cylindrical body allows to change the degree of overlap of communication holes formed on both the inner cylindrical body and the outer cylindrical body, thereby adjusting the amount of the water to be treated flowing into the inner cylindrical body, and adjusting the dissolution rate of a water-soluble solid chemical filled in the inner cylindrical body (PTL 1).

Citation List

Patent Literature

[0003]

PTL 1: JP 3173540 Y

Summary

Technical Problem

[0004]

However, in order to adjust the dissolution rate of the water-soluble solid chemical by using the technique described in PTL 1, the amount of the water to be treated flowing into the inner cylindrical body needs to be adjusted by manually rotating the inner cylindrical body according to variations in flow rate or flow velocity and the like of the water to be treated, in every time. Thus, its management is laborious.

[0005]

To solve the above problems, it is an object of the present invention to provide a solid chemical housing body that enables continuous release of an active substance in a water-soluble solid chemical for a long period of time, and also convenient adjustment of the dissolution rate of the water-soluble solid chemical.

Solution to Problem

[0006]

The present inventors found that vertically stacking a water-soluble solid chemical inside a housing container via a water-soluble film enables convenient adjustment of the dissolution rate of the water-soluble solid chemical and continuous release of an active substance in the water-soluble solid chemical for a long period of time.

[0006a]

In one aspect, the present disclosure refers to a solid chemical housing body filled with a water-soluble solid chemical inside a housing container,

wherein the housing container, comprising: a container body which is formed by fitting an upper member and a lower member; a partition wall that partitions the interior of the container body into the housing space and a non-housing space adjacent to the housing space; a partition wall communication path connecting the housing space and a non- housing space, that allows cooling water to flow between the housing space and a non- housing space and serves as an inlet and an outlet ; and a container communication path connecting inside and outside of the housing container, that allows cooling water to flow between the outside of the container body and the non- housing space, comprises a housing space capable of housing a plurality of the water-soluble solid chemicals,

an inlet for allowing the cooling water to flow into the housing space, and an outlet for allowing the cooling water to flow out from the housing space;

some or all of the water-soluble solid chemicals are vertically stacked in the housing space via a water-soluble film; and

at least some of the water-soluble films are disposed upward from the inlet and the outlet.

[0006b]

In another aspect, the present disclosure refers to a water treatment method for performing water treatment by using a solid chemical housing body filled with a water-soluble solid chemical inside a housing container,

wherein the housing container, comprising: a container body which is formed by fitting an upper member and a lower member; a partition wall that partitions the interior of the container body into the housing space and a non-housing space adjacent to the housing space; a partition wall communication path connecting the housing space and a non- housing space, which allows cooling water to flow between the housing space and a non- housing space and serves as an inlet and an outlet ; and a container communication path connecting inside and outside of the housing container, which allows cooling water to flow between the outside of the container body and the non- housing space, comprises a housing space capable of housing a plurality of the water-soluble solid chemicals, an inlet for allowing the cooling water to flow into the housing space, and an outlet for allowing the cooling water to flow out from the housing space;

wherein some or all of the plurality of the water-soluble solid chemicals are vertically stacked via a water-soluble film and at least some of the water-soluble films are disposed upward from the inlet and the outlet;

the cooling water flowing in from the partition wall communication passage comes into contact with the water-soluble solid medicine S1 located at the lowermost part of the accommodation space, elutes the water-soluble film packaging the water-soluble solid medicine S1, and then elutes the water-soluble solid medicine S1; and

a part of a water-soluble film for packaging the water-soluble solid drug S2 disposed immediately above the soluble solid drug S1 is eluted together with the elution of the water-soluble solid drug S1, and the water-soluble film eluted in part is in a state of blocking a gap between the water-soluble solid drug S2 and the accommodation space.

[0007]

The present disclosure is achieved based on the above findings and provides the following [1] to [14].

[1] A solid chemical housing body filled with a water-soluble solid chemical inside a housing container,

wherein the housing container comprises a housing space capable of housing a plurality of the water-soluble solid chemicals, an inlet for allowing water to be treated to flow into the housing space, and an outlet for allowing the water to be treated to flow out from the housing space;

some or all of the water-soluble solid chemicals are vertically stacked in the housing space via a water-soluble film; and

at least some of the water-soluble films are disposed upward from the inlet and the outlet.

CLAIMS

[Claim 1]

A solid chemical housing body filled with a water-soluble solid chemical inside a housing container,

wherein the housing container, comprising: a container body which is formed by fitting an upper member and a lower member; a partition wall that partitions the interior of the container body into the housing space and a non-housing space adjacent to the housing space; a partition wall communication path connecting the housing space and a non- housing space, that allows cooling water to flow between the housing space and a non- housing space and serves as an inlet and an outlet ; and a container communication path connecting inside and outside of the housing container, that allows cooling water to flow between the outside of the container body and the non- housing space, comprises a housing space capable of housing a plurality of the water-soluble solid chemicals, an inlet for allowing the cooling water to flow into the housing space, and an outlet for allowing the cooling water to flow out from the housing space;

some or all of the water-soluble solid chemicals are vertically stacked in the housing space via a water-soluble film; and

at least some of the water-soluble films are disposed upward from the inlet and the outlet.

[Claim 2]

The solid chemical housing body according to claim 1, wherein the water-soluble film is a packing material packing the water-soluble solid chemical.

[Claim 3]

The solid chemical housing body according to claims 1 or 2, wherein the water-soluble film is obtained by making a film from a raw material containing a polyvinyl alcohol-based resin.

[Claim 4]

The solid chemical housing body according to any of claims 1 to 3, wherein the water-soluble film has a dissolution time in water at 23°C of 8 seconds or more and 99 seconds or less.

[Claim 5]

The solid chemical housing body according to any of claims 1 to 4, wherein a gap between a lower end of the partition wall and a bottom surface of the lower member facing the partition wall is the a partition wall communication path.

[Claim 6]

A water treatment method for performing water treatment by using a solid chemical housing body filled with a water-soluble solid chemical inside a housing container,

wherein the housing container, comprising: a container body which is formed by fitting an upper member and a lower member; a partition wall that partitions the interior of the container body into the housing space and a non-housing space adjacent to the housing space; a partition wall communication path connecting the housing space and a non- housing space, which allows cooling water to flow between the housing space and a non- housing space and serves as an inlet and an outlet ; and a container communication path connecting inside and outside of the housing container, which allows cooling water to flow between the outside of the container body and the non- housing space, comprises a housing space capable of housing a plurality of the water-soluble solid chemicals, an inlet for allowing the cooling water to flow into the housing space, and an outlet for allowing the cooling water to flow out from the housing space;

wherein some or all of the plurality of the water-soluble solid chemicals are vertically stacked via a water-soluble film and at least some of the water-soluble films are disposed upward from the inlet and the outlet;

the cooling water flowing in from the partition wall communication passage comes into contact with the water-soluble solid medicine S1 located at the lowermost part of the accommodation space, elutes the water-soluble film packaging the water-soluble solid medicine S1, and then elutes the water-soluble solid medicine S1; and

a part of a water-soluble film for packaging the water-soluble solid drug S2 disposed immediately above the soluble solid drug S1 is eluted together with the elution of the water-soluble solid drug S1, and the water-soluble film eluted in part is in a state of blocking a gap between the water-soluble solid drug S2 and the accommodation space.