cumulative pore volume of pores having a size of 5 nm or more and 300 nm or less is 0.1 vol% or more and 5.0 vol% or less.

[8] The shaped bodies according to any one of [1] to [7], wherein the zeolite has one or more framework structures selected from the group of FER structures, HEU structures, YFI structures, MAZ structures, CHA structures and MOR structures.

[9] The shaped bodies according to any one of [1] to [8], wherein the zeolite has a silica to alumina molar ratio (a SiO_2/Al_2O_3 ratio) of 3 or more and 100 or less.

[10] A potassium adsorption method comprising a step of contacting the shaped bodies described in any one of [1] to [9] and a solution containing potassium ions with each other.

[11] A column comprising the shaped bodies described in any one of [1] to [9].

[12] A potassium adsorption system comprising the column described in [11].

SUMMARY

[0010a]

In an aspect of the present disclosure, there is provided shaped bodies comprising a zeolite having an oxygen 8-membered ring structure, and at least any of a silica binder and a zirconia binder, the shaped bodies being such that the ratio of the cumulative pore volume of pores having a size of 10 nm or more and 100 nm or less to the cumulative pore volume of pores having a size of 5 nm or more and 300 nm or less is 25 vol% or more and 70 vol% or less, and the shaped bodies satisfy (1) or (2) below:

(1) the average aspect ratio is 1.55 or less, and
the particle size D50 is 200 μm or more and 600 μm or less;

(2) the average aspect ratio is greater than 1.55.

[0010b]

In another aspect of the present disclosure, there is provided a potassium adsorption method comprising a step of contacting the shaped bodies as disclosed herein and a solution containing potassium ions with each other.

[0010c]

In a further aspect of the present disclosure, there is provided a column comprising the shaped bodies as disclosed herein.

[0010d]

In another aspect of the present disclosure, there is provided a potassium adsorption system comprising the column as disclosed herein.

ADVANTAGEOUS EFFECTS OF INVENTION

[0011]

The present disclosure can provide at least any of zeolite-containing shaped bodies that can remove potassium from a dialysis effluent with less dissolution of aluminum compared to the conventional treatment of dialysis effluent using a zeolite, and a method of adsorbing potassium using the shaped bodies.

DESCRIPTION OF EMBODIMENTS

[0012]

Hereinbelow, the present disclosure will be described by presenting an exemplary embodiment. The terms used in the embodiment are defined as described below. The configurations and the parameters disclosed in the present specification may be combined appropriately. The upper and lower limits of the values disclosed in the present specification may be combined appropriately, and such combinations are also included in the scope of the present disclosure. The main terms used in the present disclosure will be described below.

[0013]

structures, YFI structures, MAZ structures, CHA structures and MOR structures, more preferably a zeolite having one or more framework structures selected from the group of FER structures, HEU structures, YFI structures, MAZ structures, CHA structures and MOR structures, still more preferably a zeolite having one or more framework structures selected from the group of FER structures, HEU structures, YFI structures and MOR structures, and further preferably a zeolite having an FER structure, an HEU structure, a YFI structure or an MOR structure. The 8-membered ring zeolite may be particularly preferably a zeolite having an FER structure or an MOR structure, and may be further preferably a zeolite having an FER structure (an FER-type zeolite).

[0024]

The silica to alumina molar ratio (the SiO_2/Al_2O_3 ratio) in the 8-membered ring zeolite is preferably 3 or more, 7 or more, 10 or more, 13 or more, or 15 or more, and is preferably 100 or less, 80 or less, 50 or less, or 35 or less. Such a SiO_2/Al_2O_3 ratio tends to lead to an improved performance in adsorbing potassium from a dialysis effluent. The above upper and lower limits of the SiO_2/Al_2O_3 ratio may be combined appropriately; for example, the molar ratio may be 3 or more and 100 or less, 7 or more and 80 or less, or 15 or more and 35 or less.

[0025]

To ensure that the performance in adsorbing potassium from a dialysis effluent will be improved more reliably, the cationic type of the 8-membered ring zeolite is preferably at least any of cationic type: Na (sodium) and cationic type: H (proton), and is more preferably cationic type: Na.

[0026]

The primary particle size of the 8-membered ring zeolite is preferably 0.1 μm or more and 15 μm or less.

[0027]

The particle size D50 of the 8-membered ring zeolite is preferably 1 μm or more and 100 μm or less.

[0028]

The shaped bodies of the present embodiment comprise an inorganic binder, and