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strength (I_0) before being immersed in water based on the crushing strength (I) after being immersed in water for 900 hours is preferably 50% or more and 100% or less, and particularly preferably 75% or more and 100% or less. In the present invention, the retention rate can be used as a scale for evaluating the water resistance described above. If the retention rate is too low, the crushing strength is significantly reduced under influence of moisture when the adsorbent is used in a process including moisture. As a result, the pulverization and collapse are caused. Therefore, it is not preferred that the retention rate (I/I_0) of the crushing strength (I_0) is too low.

[0026]

The adsorbent of the present invention can have a conventionally known shape such as a spherical shape, a columnar shape, a trilobes shape, a quadrilobes shape, or the like. The shape and size are preferably adjusted to have a larger outer surface area while retaining the crushing strength. For example, the adsorbent of the present invention preferably has the columnar shape and has a diameter of 1 mmφ or more and 3 mmφ or less, and a height of 1 mmH or more and 7 mmH or less. In this case, the adsorbent has a larger outer surface area while retaining the crushing strength.

[0027]

The sulfur compound of the adsorbent of the present invention has an adsorption rate constant of at least 0.001 sec^{-1} or more as a suitable sulfur compound adsorbent. If the adsorption rate of the sulfur compound is lower than 0.001 sec^{-1}, the sulfur compound contained in the process raw material may not be sufficiently removed. The adsorption rate constant of the sulfur compound can be calculated by a method described in Examples described below.

[0028]

The adsorbent of the present invention can remove the sulfur compounds

CLAIMS

1. A water-resistant sulfur compound adsorbent (except the adsorbent containing activated carbon) for removing carbonyl sulfide from a liquid process raw material containing water and the carbonyl sulfide, comprising

a copper oxide as a copper component for adsorbing the carbonyl sulfide, wherein

a content of the copper component is in a range of 30 wt% or more and 70 wt% or less in terms of CuO, and

the adsorbent comprises a cellulose derivative in which a part of hydrogen atoms of a hydroxyl group of cellulose is substituted with one or more selected from methyl group, hydroxypropyl group, and hydroxyethyl group.

2. The water-resistant sulfur compound adsorbent according to claim 1, wherein the cellulose derivative is hydroxypropyl methylcellulose.

3. The water-resistant sulfur compound adsorbent according to claim 2, wherein the number of moles of hydroxypropoxy group contained in the hydroxypropyl methylcellulose is in a range of 0.15 or more and less than 0.25.

4. The water-resistant sulfur compound adsorbent according to any one of claims 1 to 3, wherein

a content of the cellulose derivative is in a range of 0.5 wt% or more and 5 wt% or less based on a total weight of the adsorbent.

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5. The water-resistant sulfur compound adsorbent according to claim 4, wherein a retention rate (I/I_0) of crushing strength (I_0) before being immersed in water to the crushing strength (I) after being immersed in water for 900 hours is in a range of 50% or more and 100% or less.

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