on, for example, an environment surrounding the second pipe 100. This causes aluminum chloride to be drastically deposited. It is therefore preferable to make coverage with the ceramic layer 13 in the part of the second pipe 100 that is away from the bottom of the distillation column 4 to a certain degree.

[0047]

The second pipe 100 includes a metal pipe 11 and the ceramic layer 13, as illustrated in Figs. 3 and 4. The metal pipe 11 is, for example, a pipe made of a known metal such as stainless used steel (SUS) or iron, and formed by the side wall 12 that is cylindrical. The ceramic layer 13 that covers the inner surface 15 of the side wall 12 is therefore cylindrical.

[0048]

The inner space 19 of the second pipe 100, which is a cylindrical space, is formed so as to be surrounded by a contacting surface 14 of the ceramic layer 13. The inner space 19 is an example of the inside of the pipe in accordance with the present invention. The discharge liquid 10 discharged through the bottom of the distillation column 4 flows through the inner space 19. The contacting surface 14 is the surface of contact between the ceramic layer 13 and the discharge liquid 10 flowing through the inner space 19.

[0049]

Fig. 3 illustrates a part of a straight barrel part 101 of

15 of the side wall 12 has a temperature that decreases to 70°C or lower.

[0086]

[Example 2]

The following description will discuss Example 2 of the present invention. In Example 2, as the second pipe 500 used in Example 1, used was a second pipe (not illustrated) having a structure in which a space was formed inside the side wall 12. Operation was carried out while the inner surface 15 of the side wall 12 was kept at 130°C by passing steam through the above-described space as a heat medium. Except these points, Example 2 was carried out as in Example 1.

[0087]

As a result of using the second pipe in accordance with Example 2 to produce trichlorosilane, this pipe was capable of being used stably for one year. Further, as a result of opening and checking a second pipe after the one-year use, it was found that aluminum chloride was not deposited on the contacting surface 14 (see Fig. 8) of the ceramic layer 13 throughout the second pipe.

Reference Signs List

[0088]

4: Distillation column (distillation device)

6: Metal silicon

Claims

Claim 1

A trichlorosilane production method comprising a distillation step of distilling, by using a distillation device, a first liquid containing trichlorosilane formed through a reaction between metal silicon containing aluminum in a concentration of not less than 0.10 mass% and a raw material gas containing a chloride,

the trichlorosilane production method including recovering a second liquid containing the trichlorosilane from the distillation device, the second liquid containing aluminum chloride in a molar concentration higher than a molar concentration of the aluminum contained in the metal silicon,

the distillation step including recovering the second liquid from the distillation device by causing the second liquid discharged from the distillation device to flow through an inside of a pipe having a side wall of which an inner surface is covered with a ceramic layer,

the ceramic layer containing alumina, silica, zirconium oxide, zirconium silicate, or chromic oxide.

Claim 2

The trichlorosilane production method according to claim 1, wherein the ceramic layer has a contacting surface

that comes into contact with the second liquid and that is set to a temperature of not less than 100°C.

Claim 3

The trichlorosilane production method according to claim 2, wherein a space for a heat medium to flow through is formed inside the side wall, and

the contacting surface has a temperature that is set to be not less than 100°C by causing the heat medium to flow through the space.

Claim 4

The trichlorosilane production method according to any one of claims 1 to 3, wherein the side wall has an outer surface that is covered with a heat-retaining layer for keeping, at a temperature of not less than 100°C, the contacting surface at which the ceramic layer comes into contact with the second liquid.

Claim 5

The trichlorosilane production method according to any one of claims 1 to 4, wherein the ceramic layer contains alumina.

Claim 6

The trichlorosilane production method according to any one of claims 1 to 5, wherein the ceramic layer has a thickness of not less than 1 mm and less than 5 mm.

Claim 7

The trichlorosilane production method according to any one of claims 1 to 6, wherein the raw material gas is a first raw material gas containing hydrogen chloride or a second raw material gas containing hydrogen and silicon tetrachloride.