In addition, when the residual water content in the methyl mercaptan is high (notably of the order of a few thousand ppm), and when the temperature is below approximately 16°C, part of the water can be desolubilized, decant and promote the formation of solid methyl mercaptan hydrates. These solid residues can lead to risks of clogging of equipment, leading to major safety problems for installations and transport.

To avoid these risks, the drying of methyl mercaptan is conventionally performed by adsorption of water on molecular sieves. However, this method has many drawbacks. For example, the regeneration of molecular sieves takes place at high temperatures and leads to the formation of undesirable byproducts such as dimethyl sulfide.

Furthermore, when methyl mercaptan is formed via the methanol route, traces of methanol in the methyl mercaptan to be dried can drastically reduce the water adsorption capacity of the molecular sieves. This entails increasing the frequency of regenerations, which increases production costs and the formation of undesirable byproducts.

There is thus a need for a methyl mercaptan with a low water content, preferably with the lowest possible water content.

There is also a need for a process for drying methyl mercaptan which is effective and which makes it possible to avoid all or some of the drawbacks of the known drying processes.

In an aspect, there is provided a process for drying methyl mercaptan, comprising the following steps:

1) a stream (**A**) comprising methyl mercaptan and water is introduced into a distillation column (**1**);

2) said stream (**A**) is distilled in said column (**1**);

3) the distillate (**B**) is recovered in gaseous form, preferably at the top of the column;

4) the distillate (**B**) is condensed, preferably in a condenser (**2**), so as to obtain a condensate (**C**) in liquid form;

5) said condensate (**C**) is separated, preferably using a decanter (**3**), so as to obtain two separate liquid phases:

- an aqueous phase (**D**); and
- an organic phase (**E**) comprising methyl mercaptan;

6) all or part of the organic phase (**E**) is optionally introduced into the distillation column (**1**) as reflux; and

7) a stream (**F**) comprising the dried methyl mercaptan is recovered, preferably at the bottom of the column (**1**).

In another aspect, there is provided a process for producing methyl mercaptan, comprising the following steps:

a) reacting methanol with hydrogen sulfide to form a stream (M), preferably in gaseous form, comprising methyl mercaptan, water, and possibly unreacted H_2S and sulfur byproducts;

b) optionally, said stream (M) is condensed;

c) at least one step of purification of said stream (M) is performed to obtain a stream enriched in methyl mercaptan;

d) the stream obtained in step c) is dried via the drying process as defined above.

In another aspect, there is provided the use of azeotropic distillation for drying methyl mercaptan.

One object of the present disclosure is to provide a process for drying methyl mercaptan, which makes it possible to obtain a methyl mercaptan with a low water content, preferably with a water content of less than or equal to 1500 ppm.

Another object of the present disclosure is to provide a process which can totally or partly overcome the drawbacks of the drying processes used hitherto and notably using molecular sieves.

An object of the present disclosure is also to provide a process whose drying methods are controlled and/or which do not vary over time.

An object of the present disclosure is to provide a process for preparing methyl mercaptan which makes it possible to obtain a methyl mercaptan with a low water content, preferably with a water content of less than or equal to 1500 ppm.

An object of the present disclosure is to provide an integrated process for preparing methyl mercaptan, which is more environmentally friendly and more economical.

The present disclosure meets all or some of the above objectives.

Methyl mercaptan and water can form an azeotropic mixture, preferably a heteroazeotrope. The term “azeotropic mixture” notably means a liquid mixture which boils while keeping a fixed composition (the vapor phase has the same composition as the liquid phase). Preferably, methyl mercaptan and water form an azeotropic mixture at a pressure of between 0.05 and 75 bar absolute, preferably between 1 and 30 bar absolute, more preferentially between 5 and 15 bar absolute.

Thus, the present inventors have discovered that distillation, preferably azeotropic, makes it possible to perform the drying of methyl mercaptan.

Surprisingly, the process according to the disclosure in fact makes it possible to effectively dry methyl mercaptan. In particular, the drying process according to the disclosure makes it possible to obtain a methyl mercaptan comprising between 0 and 1500 ppm of water.

Unlike molecular sieves, the drying process according to the disclosure also makes it possible to maintain drying methods which are not altered over time and which are easily controllable depending on the operating conditions, notably the temperature and pressure conditions. In particular, it is possible to control and/or choose the water content of the methyl mercaptan obtained by virtue of the drying process according to the disclosure.

Moreover, said drying process avoids the molecular sieve regeneration cycles and thus avoids the additional formation of dimethyl sulfide (DMS), an unwanted byproduct (sometimes incinerated as waste).

The drying process according to the disclosure is easy to implement and can be adapted to any installation for the production of methyl mercaptan, notably via the methanol or the carbon oxide route. It is thus possible to obtain an integrated process for the production of methyl mercaptan, which is more environmentally friendly and more economical.

According to the present invention, the unit ppm (part per million) refers to a mass fraction.

According to the present invention, the expression “between X and X” includes the limits described.

The term “drying” means the removal of water.