which the methyl hydrodisulphide CH_3SSH decomposes at ambient temperature, by reacting with itself, to give dimethyl trisulphide and H_2S according to the reaction:

$$2\ CH_3SSH \longrightarrow H_2S + CH_3SSSCH_3$$

In the case of the synthesis of DMDS by oxidation with sulphur, the very low concentrations of CH_3SSH do not enable this product to react with itself, and the reaction with the product predominantly present in the medium, DMDS, is highly favoured.

The increase in the methyl mercaptan content in the DMDS makes the synthesis of DMDS described in application EP 0 976 726 not very cost effective, owing to the volatile impurities in the DMDS (traces of methyl mercaptan and traces of dimethyl sulphide (DMS)) which are eliminated in an additional distillation step.

Indeed, its impurities give DMDS a very unpleasant and aggressive odour, which is regarded as a significant cause of trouble during the handling of this product by users.

However, the DMDS obtained, freed of the volatile impurities, still contains traces of CH_3SSH. In addition, the simple elimination of the impurities by distillation results in considerable DMDS yield losses. This is because CH_3SSH is much less volatile than methyl mercaptan and than DMS, and has a boiling point of 108°C very close to that of DMDS (boiling point between 107°C and 110°C at ambient pressure). These products (DMDS and CH_3SSH) are therefore very difficult to separate.

SUMMARY

The main objective of the ~~present invention~~embodiments disclosed herein is therefore to provide a process which makes it possible

to reduce, or even to eliminate to a very large extent as far as completely, the alkyl hydrodisulphide impurity, for example CH_3SSH in the case of the synthesis of DMDS.

The objective of the ~~present invention~~embodiments disclosed herein is also a process for eliminating the alkyl hydrodisulphide impurity, without a significant loss of dialkyl disulphide yield.

It has now been found, surprisingly, that the rate of decomposition of alkyl hydrodisulphide in the presence of corresponding dialkyl disulphide can be greatly increased by passage over a basic catalyst of a reaction crude comprising predominantly said dialkyl disulphide.

In a first aspect, there is provided a process for treating a reaction crude containing alkyl hydrodisulphide impurity and a majority of a dialkyl disulphide obtained by oxidation of at least one alkyl mercaptan with sulphur, the process comprising contacting said reaction crude with at least one basic catalyst in a separate step subsequent to the oxidation of the at least one alkyl mercaptan with sulphur to reduce the content of alkyl hydrodisulphide impurity.

In a second aspect, there is provided a process for preparing dialkyl disulphide, comprising:

a) oxidizing an alkyl mercaptan with sulphur, by basic catalysis, to obtain a first reaction crude containing predominantly the corresponding dialkyl disulphide;

b) stripping H_2S formed;

c) distilling residual alkyl mercaptan;

d) separating polysulphides from the first reaction crude;

e) final elimination of traces of volatile compounds;
f) bringing at least one stream selected from the group consisting of streams exiting step a), step b), step c), step d), and step e), into contact with a basic catalyst to eliminate alkyl hydrodisulphide by converting said alkyl hydrodisulphide to dialkyl polysulphides; and
g) recovering the dialkyl disulphide containing an alkyl hydrodisulphide content of less than 50 ppm by weight.

In a third aspect, there is provided a method for reducing the formation of alkyl hydrodisulphide during industrial synthesis of dialkyl disulphide of formula RSSR in a reaction crude obtained by oxidation of an alkyl mercaptan of formula RSH with sulphur, comprising:
contacting at least one basic catalyst with the reaction crude containing the alkyl hydrodisulphide impurity and the dialkyl disulphide of formula RSSR,
wherein R represents a linear or branched alkyl radical containing from 1 to 20 carbon atoms, optionally substituted with one or more groups, which may be identical or different, and the selected from the group consisting of halogens, amino, alkylamino, dialkylamino, carboxyl, alkylcarbonyloxy, alkoxycarbonyl, hydroxyalkyl, alkoxy, mercaptoalkyl, alkylthio, alkylcarbonylamino and alkylaminocarbonyl.

DESCRIPTION

In the rest of the present description, the expression "reaction crude comprising predominantly a dialkyl disulphide" is intended to mean a reaction medium in which the oxidation of at least one alkyl mercaptan with sulphur has been carried out by basic catalysis.

Preferably, the reaction crude is a reaction crude from which the hydrogen sulphide has been separated (for example by distillation, stripping, and the like), more preferably the reaction crude is a reaction crude from which the alkyl mercaptan that has not reacted has also been separated (for example by distillation).

Advantageously, the reaction crude is a reaction crude from which not only the hydrogen sulphide and the residual alkyl mercaptan, but also the ("heavy") polysulphides, and also optionally the traces of alkyl mercaptan and of alkyl sulphide, are separated, for example by distillation.