tralization salts is greatly reduced. In addition, said neutralization salts of choline hydroxide are strongly hygroscopic and therefore are capable to absorb even traces of moisture to readily form flowable solutions, which allow easy removal of the salts from process streams.

[0004] However, the use of choline hydroxide for mitigating fouling and corrosion also entails several disadvantages. Firstly, aqueous solutions of choline hydroxide have limited thermal stability at temperatures above 180°C and additionally develop unpleasant odors and discolor during extended storage.

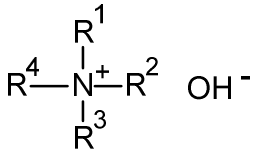
[0005] Despite the advances made in the field of prevention and control of corrosion as well as fouling, there is still an ongoing need for an effective and economically viable method for combating corrosion and fouling in chemical processes, especially chemical processes, where high temperatures will occur. It is therefore the object of the present invention to provide such a method, which in particular features all the advantages of the aforementioned prior art procedures using choline hydroxide to mitigate corrosion and fouling, but also avoids the limitations of these procedures. Thus, the corrosion and fouling reducing or preventing compound used in this method, as well as aqueous solutions thereof, should have sufficient thermal and storage stabilities and should in particular withstand temperatures well above 180°C without undergoing significant decomposition. Such temperatures prevail, for example, in some fluid or gaseous streams of refinery and petrochemical systems, such as hydrodesulfurization plants. Said compound should additionally have improved basicity and a superior ability to dissolve ammonium salts in comparison to choline hydroxide.

[0006] The object is achieved by the method described in detail below.

## SUMMARY

[0007] In an aspect, the present disclosure relates to a method for reducing or preventing corrosion or fouling in an apparatus for carrying out a chemical process, where corrosion or fouling is caused by acidic compounds present in the chemical process, which comprises the addition of at least one quaternary ammonium hydroxide of the formula (I) to the apparatus, wherein the chemical process is carried out:

[Chem.1]



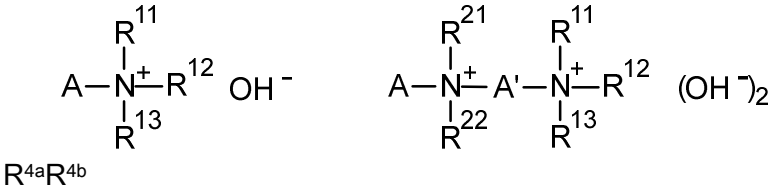
(I)

where

$R^1$, $R^2$, $R^3$ are each independently $C_1$-$C_{10}$ alkyl;

$R^4$ is selected from the group consisting of $C_1$-$C_{18}$ alkyl, benzyl, monocycloalkyl having 5, 6, 7 or 8 carbon atoms, bicycloalkyl having 6 to 8 carbon atoms, tricycloalkyl having 7 to 10 carbon atoms, where monocycloalkyl, bicycloalkyl and tricycloalkyl are unsbustituted or substituted by 1 or 2 methyl groups, and groups of the formulae $R^{4a}$ and $R^{4b}$;

[Chem.2]



where

A is $C_2$-$C_8$ alkandiyl;

A' is $C_2$-$C_8$ alkandiyl; and

$R^{11}$, $R^{12}$, $R^{13}$, $R^{21}$, $R^{22}$ are each independently $C_1$-$C_4$ alkyl;

$R^1$ and $R^2$ together with the nitrogen atom may also form a 5 or 6-membered, saturated nitrogen heterocycle, which is unsubstituted or carries 1 or 2 methyl groups; and/or

$R^3$ and $R^4$ together with the nitrogen atom may also form a 5 or 6-membered, saturated nitrogen heterocycle, which is unsubstituted or carries 1 or 2 methyl groups.

[0007a] In another aspect of the present disclosure, there is provided a use of a compound disclosed herein for reducing or preventing corrosion or fouling in an apparatus for carrying out a chemical process, where corrosion or fouling is caused by acidic compounds present in the chemical process.

[0008] The disclosure further relates to the use of the quaternary ammonium hydroxide of formula (I) for reducing or preventing corrosion or fouling in an apparatus for carrying out a chemical process, where corrosion or fouling is caused by acidic compounds present in the chemical process.

## Brief Description of Drawings

[0009] [fig.1]Figure 1 is GC/MS partial chromatogram of DEDMA-Cl pyrolysis products formed under the conditions of example 10.

## DETAILED DESCRIPTION OF THE INVENTION

[0010] In the context of the present invention, the terms and phrases used herein generically are defined as follows:

The prefix "$C_x$-$C_y$" denotes the number of possible carbon atoms in the particular case.

[0011] The term "$C_1$-$C_{18}$-alkyl" as used herein refers to saturated straight-chain or branched hydrocarbon radicals having 1 to 4 ("$C_1$-$C_4$-alkyl"), 1 to 6 ("$C_1$-$C_6$-alkyl"), 1 to 10 ("$C_1$-$C_{10}$-alkyl") or 1 to 18 ("$C_1$-$C_{18}$-alkyl") carbon atoms. $C_1$-$C_4$-Alkyl is methyl, ethyl, n-propyl, isopropyl, n-butyl, 1-methyl-n-propyl (sec-butyl), 2-methyl-n-propyl (isobutyl)