products such as elemental sulfur, as in the case of sodium nitrite. Hence, in order to prevent problems associated with hydrogen sulfide and other sulfhydryl compounds in the production system and to improve the quality of the oil and gas produced, it is desirable to be able to use the chemical as early as possible in the production process, such as via downhole injection. There remains a need for a safe and effective means to effectively scavenge hydrogen sulfide and/or other sulfhydryl compounds from hydrocarbon fluids. Ideally, the scavenge for hydrogen sulfide should be non-hazardous, non-corrosive, biodegradable, and have a scavenging performance over a wide temperature range and pH range. The present invention provides an answer to that need.

[0012] SUMMARY OF THE INVENTION

[0013] There is provided a method of reducing the amount of sulfhydryl compounds from sour hydrocarbon fluids. In the method, an aldehyde-releasing compound, which is high temperature stable and is highly water-soluble, is introduced to a hydrocarbon fluid stream as a scavenger for sulfhydryl compounds. The aldehyde-releasing compound is allowed to mix with the hydrocarbon fluid stream and the aldehyde-releasing compound is allowed to react with the sulfhydryl compounds present in the hydrocarbon fluid stream, thereby reducing the presence sulfhydryl compound in the hydrocarbon fluid stream.

[0014] There is also provided a method for reducing sulfhydryl compounds from an oil and gas production well or injection well. In this method a high temperature stable, highly water-soluble aldehyde-releasing compound is first provided. In this method, the production well or injection well has a downhole additive addition means. This downhole is accessible from the surface via known means. The aldehyde-releasing compound is added to a production well via the downhole additive addition means during production of oil or gas from the production well.

[0015] In one particular embodiment, the aldehyde-releasing compound is a hydantoin compound.

Accordingly, in one aspect of the invention, there is provided a method for reducing sulfhydryl compounds from a hydrocarbon fluid stream, said method comprising providing a high temperature stable, highly water soluble aldehyde-releasing compound selected from the group consisting of hydantoins, imidazolidinyl ureas, dimethyloxazolidines, glutaraldehydes, and mixtures thereof; adding an effective amount of the aldehyde-releasing compound to a hydrocarbon fluid stream containing a sulfhydryl containing compound; and allowing the aldehyde-releasing compound to mix into the hydrocarbon fluid stream and react with at least a portion of the sulfhydryl compound.

In another aspect, there is provided a method for reducing sulfhydryl compounds from an oil and gas production well or injection well, said method comprising providing a high temperature stable, highly water soluble aldehyde-releasing compound, selected from the group consisting of hydantoins, imidazolidinyl ureas, dimethyloxazolidines, glutaraldehydes, and mixtures thereof ; and adding an effective amount of the aldehyde-releasing compound to a well having a downhole additive means, the aldehyde-releasing compound being added via the downhole additive means during production of oil or gas from the production well or injection well.

[0016] These and other aspects will become apparent when reading the detailed description of the invention.