77666 Green corrosion inhibitors for corrosion prevention of carbon steel under CO2 and H2S conditions

A Data Management Plan created using DMPonline

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Project abstract:

The use of corrosion inhibitors is the most preferred methods because of its low cost, ease, and the ability to prevent corrosion from inside of the production tubing. Inhibitors can be easily injected into the production tubing. These inhibitors get adsorbed on the metal surface (physisorption and chemisorption), forms a protective film, and protects the underlying metal from corrosion. The use of commercially synthesized corrosion inhibitors poses a risk of environmental degradation. As a result, there is a growing interest in environmentally friendly "green inhibitors" • In this study, our aim is to investigate the corrosion inhibition behavior of aloe vera and black tea as inhibitor. Different concentrations of sugar, maltose and glycerol will be used as additives for low carbon steel exposed to 3.5% NaCl saturated withCO_2 under sweet and sour corrosion at different temperatures. • This study utilized the electrochemical experimental techniques such as LPR, Impedance, and potentiodynamic polarization to study corrosion and electrochemical behavior. Further, specimens after corrosion testing were characterized using SEM, XRD, and XPS. • Although many inhibitor chemistries are used commercially in form of organic molecules, there is still lack of understanding of the characteristics of corrosion inhibitor molecules, their adsorption to the metal surface, and corrosion inhibition properties. Moreover, it is not clear how the adsorption of the inhibitors to the metal surface and scale formation changes the inhibition behaviour. Studying the adsorption properties will help in understanding the mechanisms with which these inhibitors get adsorbed on the steel surface and cause corrosion prevention. Therefore, this study utilized molecular modelling for the estimation of the adsorption energy on Fe surface to help understand the molecular mechanisms underlying the corrosion inhibition behavior.

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Data Collection

 The exact nature of this study has yet to be defined, general assumptions about the types of data can be made
 Lab book and library related data may be stored as .docx and .xslx files or .pdf
The data set will be several GB and the data will be organised in a shot number format.

If the project involves use of personal data, a number of requirements have to be taken into account. In particular, DTU's template for registering personal data has to be used. The template and more information can be found on DTU Inside.

Data Storage

- All data will also be initially downloaded to my work laptop
- from there I will make a copy and save the copied files on the DTU drive (O) and M drive.
- computational part not determained yet.

Documentation

Not decided yet

Some data formats will be documented in student reports. Another data need more discussion

Data Sharing

Due to the confidentiality of these data, it will not be possible for reuse outside of DTU.

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Long-term Preservation

need to be discussed