IRON SULFIDE AND CALCIUM CARBONATE DESCALER

THE INVENTION

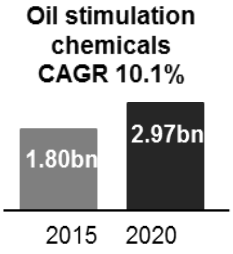
A novel chemical formulation for effectively dissolving both iron sulphide and calcium carbonate scales in reservoir, surface pipelines and tubular joints of Oil and Gas wells. The developed formulation can also eliminate the precipitation of calcium sulfate scale.

MARKET NEED

Iron sulfide scales cause significant problems in the oil and gas upstream and downstream industries. The precipitation of iron sulfide scale near the wellbore can reduce productivity of the well and leads to loss of injectivity of water injection wells.
In the past, Hydrochloric (HCl) acid was utilized to address iron sulfide deposits. Unfortunately, HCL is only effective on the pyhrottie type scale due to the very low solubility of pyrite and marcasite in HCL. In addition, the heavy corrosion of the tubular(s) and generation of hydrogen sulfide (H2S) are barriers to the use of HCL.
Recently, Tetrakis Hydroxymethyl Phosphonium Sulfate (THPS) was also introduced in industry to remove all types of iron sulfide scales; however, corrosive nature of THPS and precipitation of calcium sulfate scales when a calcium source is present are the main drawbacks to the use of THPS in the field.

Therefore, a need exists in the market for addressing (dissolving) all forms of iron sulfide scale in environments where a calcium source exists such as carbonate reservoirs.

The market size of oilfield stimulation chemicals is projected to reach $2.97 Billion by 2020, signifying a firm annualized growth rate of 10.1% between 2015 and 2020[1]. North American region is the largest market in oilfield stimulation chemicals, but, also in the oilfield services market. Specifically, Saudi Arabia is the largest market for production chemicals globally, with the U.S. the second-largest production chemicals consumer in the world



Global Market Growth (bn$)

[1]https://www.marketsandmarkets.com/PressReleases/oilfield-stimulation-chemicals.asp

COMPETITIVE ADVANTAGE

- Causes minimal corrosion (<<0.05 lbm/ft^2) and can be used up to 150°C without using corrosion inhibitors
- High removal efficiency reached (86%) for real field samples
- Thermal stability range of the developed formulation is in the range of 70 to 150°C
- Does not trigger formation damage in the target reservoir.
- Enhances permeability of both carbonate and sandstone reservoirs.
- Removes the iron sulfide and calcium carbonate scales from surface pipelines and surface separation equipment.

MARKET READINESS

This KFUPM technology is validated at laboratory environment (Technology Readiness Level 3). Scale solubility experiments and coreflooding experiments were performed to evaluate the performance of the developed chemical formulation. Experimental results indicate that the KFUPM technology offers excellent Iron Sulfide scale and Calcium carbonate scale dissolving capabilities.

PATENT PROTECTION

The invention is covered by patent applications US16/133153 and GCC2019/38298 for compositions and methods of removing iron sulfide and calcium carbonate scale deposits. The IP is owned by King Fahd University of Petroleum & Minerals (KFUPM).

LOOKING FOR A DEVELOPMENT PARTNER

KFUPM seeks an industry partner to validate this technology in relevant environment and ultimately for possible commercialization.

ABOUT KFUPM

King Fahd University of Petroleum & Minerals is a leading educational organization for science and technology. KFUPM Innovation & Technology Transfer office is tasked with taking innovation from lab to market place.

For further information, please contact:
Email:IP-License@kfupm.edu.sa