



Influence of biofilm formation on corrosion and scaling in geothermal plants

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Process failures may occur due to corrosion and scaling processes in open loop geothermal systems. Especially after heat extraction, sulfate reducing bacteria (SRB) contribute to corrosion processes due to a more favorable temperature for their growth. In biofilms containing FeS scales, corrosion processes are enhanced. Furthermore, scales can lead to reduced pipe profiles, to a diminished heat transfer and a decrease in the wellbore injectivity.

Inhibitors are frequently applied to minimize scaling in technical systems. A prerequisite for the application of inhibitors in geothermal plants located in the Molasse basin is their degradability under reservoir conditions, e. g. in a reduced environment. In order to determine the effects of scale-inhibitors on the subsurface and microbial processes, laboratory experiments were performed focusing on the microbial inhibitor degradation. First results indicate that the inhibitor degradation under anaerobic conditions is possible.

Besides the inhibitor application also other techniques are investigated to economically reduce corrosion and scaling in geothermal plants. In a mobile bypass system, the influence of biofilm formation on corrosion and scaling was investigated. The bypass system was tested at a geothermal heat store in the North German Basin. The plant is operated with highly saline fluid (salinity 130 g/L) and known to be affected by SRB. The SRB contributed to corrosion damages especially at the pump in the well on the cold side. Heat shocks were successfully used in the bypass system to reduce biofilm formation as well as corrosion and scaling processes.