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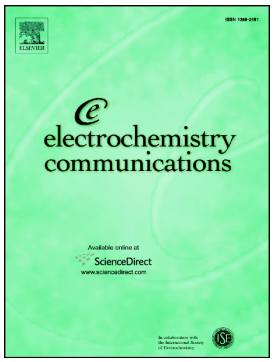

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Microbiologically-enhanced galvanic corrosion of the steel beneath a deposit in simulated oilfield-produced water containing *Desulfotomaculum nigrificans*

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Abstract

In this work, microbiologically-enhanced galvanic corrosion between the carbon steel beneath a deposit and bare steel was investigated in simulated oilfield-produced water containing sulfate-reducing bacteria (SRB), in this case *Desulfotomaculum nigrificans*. The results show that the SRB enhance the generation of a galvanic coupling effect between bare steel and the steel under the deposit, due to their different electrochemical potentials, resulting in accelerated corrosion of the steel under the deposit. In this galvanic couple the bare steel serves as the cathode and the steel under the deposit as the anode. As time increases, the bare steel also suffers from SRB-induced microbiologically influenced corrosion. The galvanic effect is reduced after a long period of incubation due to decreasing SRB activity. Moreover, in the presence of SRB the localized corrosion initiated on the steel under the deposit is greater than that occurring on bare steel.

Keywords: microbiologically influenced corrosion; galvanic corrosion; under deposit corrosion; sulfate-reducing bacteria

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