Corrosion of Sulfate-Reducing Bacteria on 20# Carbon Steel under Different Carbon Source Conditions

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Abstract：Objective Sulfate reducing bacteria (SRB) is an important corrosion factor in shale gas gathering and transportation pipeline systems, posing a threat to the safe operation of pipelines. Process and Methods In order to study the influence of carbon source on the corrosion behavior of SRB, a full immersion corrosion experience was conducted. The corrosion behavior of SRB was studied through methods such as planktonic bacterial content testing, corrosion weight loss testing, scanning electron microscopy observation, and electrochemical testing. Under the condition of a sodium lactate content of 350 mg/L, the maximum corrosion rate was 0.077 mm/a; Under the condition of a sodium lactate content of 500-3500 mg/L, the corrosion rate gradually decreased to 0.022 mm/a. Conclusion The results indicate that the reduction of carbon sources leads to bacterial starvation, which directly obtains electrons from metals and exacerbates corrosion. Under low-carbon source conditions, the content of planktonic bacteria is relatively low, but the corrosion rate and pitting depth may be large. It is not appropriate to use the content of planktonic bacteria to determine the strength of bacterial corrosion.

Keywords： carbon steel; sulfate-reducing bacteria; carbon source; starvation

Reference

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