Study on bacterial corrosion behavior and anti-corrosion measures of crude oil tank bottom sediment

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Abstract : In order to solve the problem of bacterial corrosion caused by oil sludge deposit and water at the bottom of the tanks during the long-term service of crude oil storage tanks, and then improve the emergency response capability and transport capability to deal with the sudden supply interruption of crude oil, this paper studied the corrosion behaviour and law of different bacteria (SRB, IOB, SRB+IOB) in the crude oil storage tanks in the west of China by the bioculture technology, weightlessness analysis, electrochemical testing, surface analysis, orthogonal experiments, etc. The corrosion behaviours and laws of steel for storage tanks in the environment of sedimentary water at the tank bottom revealed the growth laws and mechanisms of corrosion of SRB and IOB; the bactericidal enhancement effects of different combinations of D-amino acids, bactericides and bacteria on biofilm colonies on steel surfaces were investigated; the behaviors and mechanisms of different bacteria controlling the corrosion of actual colony through competition in the environment of oil sludge were explored, a variety of anticorrosive microorganisms mixed to control actual colony corrosion in oil and gas fields was evaluated. Finally this study developed D-amino acid-enhanced bactericidal corrosion inhibitor and biological inhibitor products that suitable for oil sludge corrosion at the bottom of the tanks, and formulated an effective bacterial corrosion control strategy of the bottom of the tank sediments, laying the foundation of the long term safety of the crude oil tanks in service.