Effect of Rotating Speed and Hydrostatic Pressure on Erosion-Corrosion Behavior of X65 Pipeline Steel

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A simple rotating experimental setup with adjustable rotating speed and hydrostatic pressure was established to simulate the erosion-corrosion environment. The effect of rotating speed and hydrostatic pressure on the erosion-corrosion behavior of X65 steel in 3.5 mass% NaCl was investigated by polarization, electrochemical impedance spectroscopy, and scanning electron microscopy. The results revealed that the rotating speed changed the corrosion type of X65 steel from a pure uniform electrochemical corrosion into the combination of uniform corrosion and local damage, which was aggravated with increasing the rotating speed. The hydrostatic pressure has the opposite effect on the uniform and local corrosion of X65 steel, showing a decrease of uniform corrosion and an increase of local damage.

Keywords: X65 steel; rotating speed; hydrostatic pressure; erosion-corrosion; local damage

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