

## عنوان مقاله:

Kinetics Analysis of X65 Steel corrosion reactions at the simultaneous presence of CO<sub>2</sub> and H<sub>2</sub>S

## محل انتشار:

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## خلاصه مقاله:

In this research, the effect of fluid velocity on corrosion kinetics of X65 steel has been investigated in an aqueous solution containing CO<sub>2</sub> and H<sub>2</sub>S according to the steel structures corrosion sensitivity in aqueous environments. Therefore, the aqueous solution saturated with CO<sub>2</sub> and containing 50 ppm of H<sub>2</sub>S was used to perform the corrosion tests. The fluid velocity varied between 0 to 1000 rpm, and the tests were carried out at three different temperatures of 25, 45, and 65°C. During these tests at various periods, parameters like the iron ion concentration (iron count) (ICP) and instant corrosion rate using the LPR test were monitored. The corrosion products were characterized using XRD and SEM methods. Also, the kinetics and mechanism of the corrosion process were analyzed in these conditions. The results at various fluid velocities showed that the first layer containing mostly mackinawite does not have the appropriate density, in such a way that the porosities and micro-cracks can be a suitable route for corrosive ions to penetrate to the steel surface. Then, as time passed and the thickness of the corrosion product film increased, the number of porosities decreased; this led to the compactness of the product film and resulted in the decrease of diffusion and ion exchange in the interface and consequently the corrosion rate.

## کلمات کلیدی:

Corrosion Mechanism , Carbon Dioxide (CO<sub>2</sub>) , Hydrogen Sulfide (H<sub>2</sub>S) , Fluid Velocity , , Kinetics Analysis

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