

Corrosion behavior of carbon steel in sour waste water varying pH

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In this work, the corrosion behavior of carbon steel AISI 1018 immersed in a sour water sample solution collected from a refinery plant, was studied, changing the pH from 5.5 to 8.5, stirring at 500 rpm and at 50°C. Polarization curves indicate that both the anodic and the cathodic branch are not sensitive to pH change, but analysis of surface samples by scanning electron microscopy (SEM) shows different corrosion products. The results of electrochemical noise (current) show that the increase in pH would present localized attack and hence the corrosion rate is higher so the corrosion products formed could not be protective. On the other hand when the solution is more acidic (i.e. lower pH) will be showing a tendency to repassivation. However, at pH 8.5 the current oscillations were not intense and reached minimum amplitude, so localized attack is inhibited. These results have shown that variation in pH units can cause changes in the structure of the corrosion products and in localized attack and thus the severity of damage in the metal surface varies.

Keywords: Corrosion, Sour water, Carbon steel, pH