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ABSTRACT

The effect of egg shell powder (ES) as an environmental friendly inhibitor was studied for its corrosion inhibitive tendency on **N08904** austenitic stainless steel in simulated saline (3.5% NaCl) solution using potentiodynamic polarization, weight loss, and SEM/EDX at room temperature. The experimental data explained the effective performance of ES with values of 57% – 100 % inhibition efficiency, at 2g – 10g inhibitor concentration from weight loss tests due to the inhibition of stainless steel. The electrochemical action was as a result of the ionized particles which inhibit the compound influencing the redox reaction mechanism causing surface corrosion. ES's best performance was achieved when 6 g of the inhibitor concentration was added to the saline medium. Corrosion rate value decreased progressively with the presence of inhibitor because of anions adsorption at the interface of the metal film. Corrosion potential (Ecorr) value was found to decrease from -0.3991 V to -0.3447 V in the presence of inhibitor at 2g concentration, decreasing gradually to -0.2048 at 6 g inhibitor concentration. The compounds identified in the ES completely adsorbed onto the surface of stainless steel as observed from the EDX analysis. The ES adsorption on stainless steel surface obeyed Langmuir adsorption isotherm. A corroded morphology with pits was observed in the SEM results without ES which contrast the images obtained with the presence of ES.

Keywords: Austenitic stainless steel; Corrosion; Inhibition; Egg shell; Chloride; Langmuir

1. INTRODUCTION