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THE EFFECTIVENSESS OF SOME α, β UNSATURATED ALDEHYDES AS PICKLING INHIBITORS

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Descaling of steel objects in many cases is accomplished by " pickling ", which consists of immersion of the material in an acid solution. Pickling causes the loosening of the scale and its detachment through gas development. Pickling also gives rise to high dissolution rates of the metal and its embrittlement due to hydrogen entry into the material. It has therefore been a common practice to employ pickling inhibitors to suppress metal dissolution and hydrogen evolution during pickling.

Aromatic amines and long-chain n-alkyl ammonium salts are the main constituents of most of such inhibitors. Aromatic aldehydes have also been found to inhibit corrosion of metals in HCl media to some extent.

The present paper deals with a comparative study of the effectiveness of cinnamaldehyde and citral as inhibitors with respect to " Rhodine ", a commercial pickling inhibitor used in the Ceylon Steel Corporation. The experimental medium consisted of 18%, HCl with varying inhibitor contents of 0.005%, 0.01%, 0.05%, 0.1% and 0.5%. For each of these inhibitor concentrations the corrosion currents were estimated by the extrapolation of potentiostatic Tafel lines. Corrosion currents were also independently evaluated through the polarization resistance measurements. The inhibitor efficiencies were compared to ascertain the effectiveness of inhibition of the inhibitors investigated.

It was found that the inhibitor efficiency with Rhodine was 99.8% while cinnamaldehyde and citral gave efficiencies of 97% and 79.2% respectively at 0.5% inhibitor concentration. Thus, cinnamaldehyde appears to be nearly as effective as the commercial inhibitor Rhodine in its efficiency.