

## ABSTRACT

The stress corrosion cracking behavior of AISI 316 stainless steel has been studied in Samans' solution using both static loading test and slow strain rate technique test. The effect of sensitization of the steel on IGSCC susceptibility has been established.

The effects of stress, addition of sodium chloride, disodium hydrogen phosphate and triethanolamin to test solution, applied potential and electrostatic charging on the IGSCC behaviour have been investigated. The effect of strain rate has also been studied in the SSRT test. Some tests have also been carried out in conventional boiling  $\text{MgCl}_2$  solution for the sake of comparison of SCC behaviour.

The results are indicative of an adsorption induced dissolution mechanism of the cracking process. A model explaining the effect of electrostatic charge on crack propagation has been presented.

Key words : Stress Corrosion Cracking, AISI 316 Stainless Steel, Polythionic acid, Sensitization, Stress, Additives, Polarisation, electrostatic charging, SSRT.