

Corrosion Prevention of Galvanized Steel in Sodium Chloride Solutions

R. Senthoran¹ and N. Priyantha^{1,2}

¹*Postgraduate Institute of Science, University of Peradeniya*

²*Department of Chemistry, Faculty of Science, University of Peradeniya*

Galvanized steel (GS), due to its protective zinc coating, is fairly stable under normal atmospheric conditions for short periods of time. Upon prolonged exposure to normal conditions or short term exposure to corrosive environments, it undergoes corrosion. Exposure of corrosion-resistant metal surfaces in a harsh environment for a short period of time is equivalent to, in many aspects, exposing such surfaces in mild environmental conditions for long periods which simulate real environments. In this respect, the effect of methanol extract of dry tea leaves as a green inhibitor on GS corrosion in an aerated 0.1 mol dm^{-3} NaCl at pH = 2 was investigated within the laboratory time scale by mass loss measurements of GS specimens, time dependence of pH in corrosive media, electrochemical impedance spectroscopic (EIS) analysis and Tafel slope analysis.

Rate of corrosion is found to be decreased with the introduction of the tea leaves extract to the corrosive environment. Results obtained from all the above techniques reveal that the extract of matured tea leaves has inhibition potential on GS corrosion in 0.1 mol dm^{-3} NaCl at pH=2. According to EIS measurements, the inhibition efficiency for 10% extract of dry tea leaves is about 85% after 18 h exposure to the corrosive medium.