Corrosion Study on the Performance of Stainless Steels in Peracids Bleach Media

Rohtash[1], Ajay K. Singh[2] and Rajendra Kumar[3]

ABSTRACT

The paper industry is replacing chlorine based bleach chemicals with non-chlorine containing chemicals e.g. peroxide, ozone, peracids etc. with the aim of controlling water pollution. Changeover to the new chemicals in the bleaching process is likely to affect the metallurgy of the existing bleach plants due to change in the corrosivity of the media. Accordingly, corrosion investigations were performed in peracids namely peracetic acid and Caro's acid to test the suitability austenitic stainless steels 316L, 317L and 2205.The performance of candidate alloys was evaluated by long term immersion tests and Electrochemical polarization tests at pH value 4.0 for peracetic acid (PAA) media and 5.0 for Caro's acid (CA) media maintaining concentration 0.2% as active oxygen in pulp-free laboratory in solutions of PAA and CA without and with chloride 1000 ppm. To study the effect of inhibitors extending the upper limit of chloride in liquors, measurements were also made with two types of chelants (EDTA & $MgSO_4$). The results showed peracetic acid to be more corrosive than Caro's acid and EDTA is better inhibitor than $MgSO_4$.

Key Words: Bleach plant, Peracids, bleach media, chelants, stainless steel, electrochemical polarization, weight loss, cell reaction, stainless steel localized corrosion, material selection.