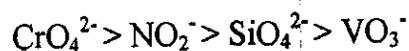


atmospheric corrosion of iron and steel can stimulate attack on non-ferrous materials.

Abdallah et al [124] found that the addition of  $\text{CrO}_4^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{SiO}_4^{2-}$  and  $\text{VO}_3^-$  to 1M NaCl solutions shifted the pitting corrosion potential of 316 stainless steel and Incoloy 800 in the noble direction indicating the increased resistance to pitting attack. The percentage inhibition efficiency of pitting corrosion as revealed from the change in the integrated charge amounts in the presence and absence of inhibitors, decreases in order:



The positive shift of the pitting potential of the electrode samples with increase in concentration of these anions indicates an increase in protective ability of the film formed on the electrode surface. The increased nature of passive film may be attributed to the film strengthening through increased incorporation of the adsorbed anion on electrode surface [145] or due to the increased availability of the adsorbed anions to repair the defect in the passive film.

The effect of some compounds such as acridine (A), benzyl quinolinium chloride (BQCl), dodecyl quinolinium bromide (DDQBr), tributyl benzyl ammonium iodide (TBNI) and potassium iodide (KI) as corrosion inhibitor for dissolution of Ni in 0.1M  $\text{HClO}_4$  was investigated [43]. Corrosion rate was reduced considerably by KI and TBNI. DDQBr showed a good inhibitive action, while BQCl had only a small effect, and a stimulated corrosion

of the Ni. This phenomenon is due to that the inhibitors studied can adsorbed on the surface of the metal, handing the anodic dissolution as a function of their molecular characteristics.

The influence of the organic sulfur-containing compounds on the corrosion of ferrite and austenitic stainless steels in sulfuric acid was studied [146]. The results showed that the anodic dissolution and self-corrosion of stainless steel were remarkably accelerated in solutions with a low amount of the organic sulfur containing compounds ( $0.02 \text{ m mol/dm}^3$ ). With an increase of the organic sulfur containing compound concentration more and more the organic sulfur-containing compound molecules adsorbed on the electrode surface and segregated the metal surface from the solution, which caused the decrease of the anodic dissolution and hydrogen evolution current of stainless steels.

It is known that the organic sulfur-containing compounds have two opposite effects on the corrosion of iron and steels (Fe-Cr-Ni alloys). On the one hand, the organic sulfur-containing compound molecules can chemisorb on the surface of iron and steels, segregate the metal surface from the solution and therefore, inhibit the corrosion of iron and steels [147-148]. This is called the covering effect of the organic sulfur-containing compounds. On the other hand, some of the organic sulfur-containing compound molecules adsorbed on the surface of iron may decompose and give out  $\text{H}_2\text{S}$  which can accelerate the corrosion of iron and stainless steel in acid solutions [149,150]. For iron and stainless steels the covering effect of the organic sulfur-containing compound molecules is usually

much stronger than its accelerating effect, the organic sulfur containing compounds are therefore, widely used as corrosion inhibitors in acid solutions [150-152].

The effect of some mercaptotriazole compounds on the corrosion of Fe-Cr-Ni alloy in sulfuric acid solution was studied at different temperatures using weight loss, electrochemical polarization and potential decay techniques [153]. Surface studied have also been carried out using AES and SEM techniques. The mercaptotriazole compounds are cathodic inhibitors and having the tendency to stimulate the anodic reaction of Fe-Cr-Ni alloy e.g. the critical current density increases remarkably along with brooding of active-passive transition peak in presence of these inhibitors. These compounds are having the tendency to destalize the passive film formed at the anodic potentials. The compounds were found to obey the Langmuir adsorption isotherm. Percentage inhibition efficiency increases with increasing the temperature (93% at 298K to 96% at 318K) and concentration of inhibitors (85% at 100ppm to 96% at 800ppm).

The effect of addition of the sodium salts of chromate, phosphate, molybedate, tungstate and carbonate on the Potintiodynamic anodic polarization curves of nickel and Inconel 600 in 0.1M HNO<sub>3</sub> containing 0.1M NaCl was studied [154]. It was found that, the pitting corrosion potential was shifted to more noble direction indicating the increased resistance toward the pitting attack. The inhibition efficiency of additives decreased in the following order:



The best inhibitive action of  $\text{CrO}_4^{2-}$  is attributed to the formation of the protective  $\text{Cr}_2\text{O}_3$  as a result of Cr reduction [155]. Inhibition by  $\text{HPO}_4^{2-}$  was attributed to the formation of highly insoluble salt with the dissolved metal ions. Passivation by molybdate occurs as a result of specific adsorption rather than inhibitor reduction [156]. Inhibitive effect of  $\text{WO}_4^{2-}$  is mostly due to its strong adsorption on the surface process causes a protective film of  $\text{Fe}_2\text{O}_3$ . The low inhibitive action of  $\text{CO}_3^{2-}$  may be attributed to the partial passivation of the electrode surface.