

**INFLUENCE OF NI(II) ON THE
FORMATION OF IRON
OXIDE/HYDROXIDE IN FERROUS
CHLORIDE SOLUTION**

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Steel structures located near seashore are prone to high rate of corrosion due to chloride-rich environment. Alloying steel with elements like Cu, Cr and Mn could enhance their weathering properties. However, high corrosion rate of conventional weathering steels(0.3Cu-0.6Cr-Fe, 0.38Cu-0.58Ni-Fe) has been observed on exposure to marine environment and hence it is necessary to produce new weathering steel. Recently, Ni alloyed steel is reported to show high corrosion resistance under Cl-rich environment and has been the subject of interest. Long-term behavior of atmospheric corrosion of steel depends on electrochemical and solid state property of iron oxide on steel. Further, the dense and stable oxide is responsible for the protection from atmospheric corrosion. Investigation on the influence of Ni on the formation and property of oxide is essential for development of Ni alloyed steel for new weathering steel in Cl-rich environment.

This study reports on the behaviors of aerial oxidation of $Ni_xFe_{1-x}(OH)_2$ in Cl^- -containing solution as a function of pH and nickel ion concentration.

$Ni_xFe_{1-x}(OH)_2$ prepared by adding NaOH solution to a mixed solution of $NiCl_2$ and $FeCl_2$ with various ratio of Ni(II) to Fe(II) was oxidized by an introduction of air. The ratio of $[OH^-]/[metal\ ion]$ was varied between 1/5 and 2. The evolution of electrode potential and solution pH with time

were monitored with SCE, Pt electrode and pH electrode. Phase analysis and chemical analysis of final products were conducted with X-Ray diffraction, FT-IR and Atomic Adsorption Spectroscopy respectively.

Keywords: atmospheric corrosion, Ni alloyed steel, weathering steel, Cl^- , iron oxide/hydroxide.