

Corrosion of Heat Exchanger Materials

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Abstract

In waste-fired boilers corrosive gases containing HCl and SO₂ are present as well as solid and molten chloride salts, which are formed by condensation of aerosols within the flue gas on cooled material surfaces i.e. heat exchanger tubes. Active oxidation by HCl gas is one of the most important corrosion mechanism on the surface of boiler tubes, leading to accelerated mass loss at temperatures $T > 400$ °C. Furthermore, especially the presence of salts accelerates the corrosion process, if they are associated with the formation of molten phases on the material surface or in the oxide scales. As the most common salt deposits on boiler steels are chloride mixtures, this report focuses on kinetic investigations of high temperature corrosion metals and alloys beneath a molten chloride deposit.

The experimental investigations were accompanied by FactSage calculations on the stability of chloride and oxide phases as well as on the miscibility of metal-chlorides with the chloride deposits in question.