Effectiveness of different additives on high temperature corrosion of slagging in waste incineration systems

Dengjia Yuan, Honghua Ge

Author's affiliation and full address: Shanghai Key Laboratory of Materials Protection and Advanced Materials in Electric Power, Shanghai Engineering Research Center of Energy-Saving in Heat Exchange Systems, Shanghai University of Electric Power, Shanghai 200090, China

Presenter's e-mail address: yuandengjia@mail.shiep.edu.cn

Abstract Industrial waste has complex and diverse compositions, this implies that during the prolonged operation of a waste incineration boiler, the corrosiveness of the alkali chloride slag layer, which accumulates on the high-temperature heating surface material and condenses locally, may poses a threat to the safe operation of the equipment. The influence of slag layer formation during industrial waste incineration on the high-temperature corrosion behavior of 20G steel used in incinerators was investigated, as well as the effects of different additives. The experimental results show that the slag layer exacerbates the high-temperature corrosion behavior of carbon steel at 500℃, and the coarse-grained slag layer has a certain protective effect on the carbon steel as the temperature rises (after 700℃).The addition of alumina and vermiculite at 500℃ can effectively inhibit the corrosion of the slag layer on the carbon steel of 20G, while the dolomite and kaolin promote the corrosion of the carbon steel. After 10% of alumina was added, the corrosion rate of the slag generated by industrial incineration combustion on 20G carbon steel was reduced by 23%. At 500℃, the high-temperature corrosion process of the slag layer was dominated by salts such as NaCl and Na_2SO_4, chloride salts accelerate the destruction of the oxide layer on the surface of the metal, and SO_2 and SO_3 produced by the dissociation of sulfate salts can easily penetrate the oxide layer, leading to further corrosion of the metal. After the addition of alumina reduced the cracking of the corrosion layer on the surface of the carbon steel and increased the oxide film protective layer, thus reducing the metal corrosion caused by the slag layer.

Keywords *high temperature corrosion, slag, alumina, corrosion characteristics*

Reference

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