Study on high temperature corrosion-resistance, erosion-resistance of intermetallics composite coating of High speed arc spraying

Work environment of large-scale utility boilers is very bad, with adverse hot corrosion. The main fuel of boiler is coal with containing S, K, Na, V and other impurities, and form SO2, SO3, H2S, V2O5, etc. during combustion, with O2, NaCl and other reactions formed molten salt deposition on the surface of duct, whereby accelerating corrosion damage of the material.

Through spraying high Ni-Cr alloy intermetallics composite coating on the pipe wall, it can effectively prevent hot corrosion, but with high cost and difficult to promote. Fe-Al intermetallics composite coating combines with low density,excellent high-temperature oxidation and sulfidation resistance. However, their room-temperature brittleness and inadequate yield strength at elevated temperatures are the major disadvantages hindering their industrial applications. In order to improve the inter-Fe-Al intermetallic compound forming, high-speed arc spraying and cored wire (iron mixed bag iron and aluminum powder) are successfully applied to prepared Fe -Al between metal compound and composite coatings (Fe-Al, Fe-Al / WC, Fe-Al / Cr3C2) in the laboratory. The results showed that Fe-Al intermetallic compound and composite coatings are of excellent corrosion and erosion resistant properties. Fe-Al intermetallic composite coating is known as "the cheaper stainless steel."