

2016

Microstructure development during pack aluminization of Z60CDV5 steel.

Alioui Sara, Boudebane Said

Abstract : Aluminium was deposited on the surface of steel by the pack cementation method in active medium to improve its high temperature oxidation resistance. In this research, coating of aluminium was applied on Z60CDV5 hot work tool steel substrate. The growth kinetics of these Al-rich intermetallic shells are studied as a function of aluminization time and pack activity at 1050°C. The (OM) results showed that the aluminized coating consisted of different layers. The XRD results have shown that the structure of the layer is mainly composed of the γ solution and intermetallic FeAl, FeAl $_3$, Fe $_2$ Al and others, according to the Fe-Al phase diagram. However, the shape and extent of each intermetallic depend on the sample holding time in the active medium and the treated steel composition. The uncoated and coated specimens were subjected to isothermal oxidation until 1000°C. The oxidation results revealed that the application of a coating layer increased the oxidation resistance of the coated Z60CDV5 samples as opposed to the uncoated one.

Keywords : Aluminization, Oxides, Intermetallic compound, High temperature oxidation