Steam assisted oxide growth on aluminium alloys using oxidative chemistries: Part I
Microstructural investigation

Steam assisted oxide growth on aluminium alloys using oxidative chemistries: Part I Microstructural investigation

The surface treatment of aluminium alloys under steam containing KMnO₄ and HNO₃ resulted in the formation of an oxide layer having a thickness of up to 825 nm. The use of KMnO₄ and HNO₃ in the steam resulted in incorporation of the respective chemical species into the oxide layer. Steam treatment with solution containing HNO₃ caused dissolution of Cu and Si from the intermetallic particles in the aluminium substrate. The growth rate of oxide layer was observed to be a function of MnO₄⁻ and NO₃⁻ ions present in the aqueous solution. The NO₃⁻ ions exhibit higher affinity towards the intermetallic particles resulting in poor coverage by the steam generated oxide layer compared to the coating formed using MnO₄⁺ ions. Further, increase in the concentration of NO₃⁻ ions in the solution retards precipitation of the steam generated aluminium hydroxide layer.

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