Caractérisation des produits d'aluminisation obtenus, par immersion dans un bain liquide ; protection contre la corrosion.

Alima MEBREK

Soutenue en: 2004

Abstract : This work presents the results of a research on the aluminization of alloy (Cr, Mo). The aim intend doesn't a direct a direct protection of the material but the contribution of a noble element in order to form an intermetallic of better properties, or the later formation of an Al2O3 oxide as protective coat against the corrosion work time.This study justifies an view industrial point (aeronautics, oil-bearing, etc...) especially because of the constant temperature increase of metal work and severe environmental conditions.Our main concern consists of studying certain parameter influencing on the composition and on resistance of the deposit (in high activity), as: - The initial surface state on the adhesion of the deposit. - Holding time on the kinetics of layer growth obtained.We showed that the resistance of the deposit is affected by several parameters: - The roughness of surface of the coating, - The inter-diffusion substrate/coating, - The microstructural modifications during the coating.The obtained results by roughness measures put in relief the initial state of the material and the morphology of surfaces in dedendum and addendum. This type of morphologies governs the process of matter transportation. What has been confirmed by the EDS analysis which clearly show a repartition and grading of the present elements in the alloy and that the coating is composed of alloying elements which the composition is variable in particular iron and chromium. The EDS analyses confirm the discontinuity of these elements to interface metal/oxide. According to the type of interface (regular or irregular) their elimination is achieved by diffusion. What confirms the determining role of interface. The mechanism and these phenomena are extensively justified by hardness relationship curves realized on the samples transverse cuts. This chemical property by EDS is in accordance with RX diffraction results.The time affects the formation kinetics of the first phase at the first instants of immersion but not on the layer thickness evolution, what has been demonstrated after 15 minutes of holding. The time affects the growth kinetics of diffusion layers and properties of these layers.For lower immersion times, the layers are continuous and more compacts. Which is in very good interrelationships with optical microscope results. The coating is constituted of many alloying elements where the composition is variable according to the layer thickness. The combination of these elements forms some phases as oxides, intermetallics with reference to the bibliography and the alloy Fe-Al diagram. these phases could be respectively FeAl3, Fe2Al5, FeAl2, Fe2Al3, FeAl, Fe3Al and aluminum oxides.

Keywords : Alliage Fe (Cr, Mo) ; Aluminisation ; Rugosité ; Etat de surface ; Interface ; Dépôt ; Microstructure ; Résistance à l'oxydation à chaud.