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Title lecture

Effect of Annealing on Scratch Resistance and Morphology of Vanadium-Platinum Multilayer Systems

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Abstract

It is well known that physical and mechanical properties play very important role in applications of platinum and platinum alloys in variety of industrial fields. Besides the bulk materials, our research interests were focused on coated systems and their applications where the surface properties are of crucial importance.

We investigated the multilayered structures of platinum and vanadium subjected to elevated temperatures. In order to study the annealing effects on scratch resistance and coating morphology several complementary techniques were employed. The scratch resistance was determined using nano-scratch tester while the coating morphology has been studied by scanning electron microscopy and nuclear microprobe technique. The phase analyses of the annealed systems were performed using the X-ray diffraction. The experimental results show that the coating morphology and roughness depends on coating thickness and they are significantly affected by annealing temperature. It has also been found that the annealing improved the scratch resistance and adhesion properties of both single and multilayer vanadium-platinum coated systems. A greater scratch resistance of annealed coatings is attributed to formation of several vanadium rich phases.