

Synthesis and Property Evaluation of TiC Coatings on Aluminium 6113 Alloy by Tungsten Inert Gas Cladding

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Abstract

In recent years, aluminium and its alloys have gained significant attention in the automotive and aerospace industries due to their high strength-to-weight ratio and low density. However, their widespread use in industrial applications is often limited by poor tribological performance. Titanium carbide (TiC) as a coating material has different applications in industries because of its high electrical and heat conductivity, high melting temperature, low density, and excellent tribological properties. Surface modification of Al 6113 alloy by depositing TiC could enhance their tribological properties and thereby enhance its scope of applications. In the present work, hard TiC deposited on aluminium alloy substrate by using tungsten inert gas (TIG) cladding process and the effect of TIG current on coating was evaluated using the scanning electron microscopic images of the coating developed. Furthermore, microhardness measurements were carried out using a Vickers micro-indentation hardness tester. The average micro-hardness of the coating varies with in the range of 225–292 HV_{0.5} which is 4 to 5 times higher than the uncoated Al alloy substrate (50 HV_{0.5}).

Keywords: TIG cladding, TiC coating, Al alloy, Micro-hardness

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