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IMPACT RESISTANCE OF ELECTROLESS Ni-P COATINGS ON ANODIZED AA6061 ALLOY

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INTRODUCTION

Automobile industries require Al components with good mechanical properties. NiP coatings produced by the electroless deposition often increase mechanical resistance. Their durability is mostly dictated by the adhesion between NiP coating and substrate e.g. anodic Al_2O_3 . The NiP coating might also benefit friction reduction and wear resistance. In this work the influence of Al alloy and processing conditions on NiP adhesion is studied by impact tests.





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EXPERIMENTAL

The Ni-P coatings were fabricated by electroless deposition onto anodic Al₂O₃ on AA6061 alloy substrate, produced by anodizing in H_2SO_4 . The Ni-P coatings were deposited with or without Zn interlayer. The impact test followed ASTM D 2794 by using an 8 mm diameter steel ball and 10 cm, 25 cm and 50 cm dropping heights. The morphology, elemental composition of surfaces and cross-sections were characterized by SEM and EDX methods.





CONCLUSIONS

- 1. According to the cross-sectional and EDX analysis, the presence of Zn in the interface may not be beneficial for NiP adhesion to AI_2O_3 substrate.
- 2. Without Zn interlayer, Ni concentration is about 2 times higher in the interface when compared to AI_2O_3 -Zn-NiP coatings.
- 3. Application of electroless NiP coatings onto anodic Al₂O₃ significantly without Zn interlayer improves mechanical properties and impact resistance.

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