SAIP2012

Contribution ID : 168

Annealing effects on Pt coating morphology

Tuesday 10 Jul 2012 at 17:30 (02h00')

Abstract :

The formation of intermetallic phases and coating surface morphology of Pt thin films deposited on thick Al substrates has been studied. Coatings were prepared under high vacuum using an electron beam evaporation system. Scanning electron microscopy (SEM) and the Particle Induced X-ray emission (PIXE) were used to study the surface morphology of the coatings while the X-ray diffraction (XRD) technique was used to study phase formation in the Al-Pt system after annealing at elevated temperatures in an unprotected atmosphere. The scanning electron microscope studies revealed that the morphology of thin platinum coatings is affected by annealing parameters such as temperature and time. Coating wrinkling/rumpling and increased surface roughness were the main features observed in the annealed coated systems considered in this study. The investigation of phase formation by XRD and RBS revealed the formation of the following intermetallic phases: Al2Pt, Al6Pt, Al21Pt8, and Al21Pt6 when annealed at different temperatures and times. The change in coating morphology has been attributed to the formation of the platinum/aluminium intermetallic phases.

Award :

yes

Level :

MSc

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Paper :

Yes

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Session classification : Poster Session

Track classification : Track A - Division for Condensed Matter Physics and Materials

Type : Poster Presentation