عنوان مقاله:

FEASIBILITY OF PRODUCING NANO STRUCTURED METALLIC AND NON-METALLIC COATINGS ON Al SUBSTRATE USING MECHANICAL COATING ROUTE

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خلاصه مقاله:

In this paper, the possibility of mechanical coating of aluminum with either Ni or SiC using planetary ball mill was studied. The Al substrate was fixed inside of the vial lid of a planetary ball mill filled with milling balls and starting powder. The phase analysis and crystallite size measurement of the coatings were carried out using X-ray diffraction (XRD) method. Scanning electron microscope (SEM) was employed to study the coating/substrate interface and coating thickness. Hardness and wear resistance of coatings were also measured. The results indicated that all coatings have relatively uniform thickness. SiC coating shows poor compaction and adhesion to the Al, while nanostructured Ni coating is well-bonded to the substrate. Moreover, Ni coating showed higher hardness and wear resistance compared to SiC coating. It was found that the balls collision will result in the grain refinement of the coating as well as Al substrate. Mechanically deposited Ni coating shows higher hardness value compared to those obtained by conventional methods. This has been related to the induced grain refinement phenomenon.

کلمات کلیدی:

Mechanical coating, planetary ball mill, Hardness, Ni and SiC coatings