

ABSTRACT:

Titanium alloys are commonly used in biomedical application in hard tissues replacement especially for knee and hip implants. Surface modifications are required prior to diamond coating process for improving tribological and wear properties of the titanium alloy. In this study, experiments were carried out to investigate the effects of different carburizing times on the adhesion strength of carbide layer formed on the Ti-6Al-7Nb. Prior to carburization process, all samples were treated to remove residual stress and oxide scales by annealing and pickling processes respectively. Hard wood charcoal powder was used as a medium. The carburizing process was carried out for 6, 12 and 24 hours at 950 °C under normal atmospheric condition. Surface morphology, carbide layer thickness and adhesion strength were evaluated using SEM, XRD, 3D Surface Profilometer and Blast Wear Tester (BWT). It is found that a mixture of oxide and carbide layers formed on the substrate and the thickness of these layers increases with carburizing time. It is also revealed that the 24 hr carburizing time provides the strongest adhesion strength among the three and TiC as the dominant layer.