Comparison of Tribological Properties of TiO₂, ZrO₂ and TiO₂-ZrO₂ Composite Films Prepared by Sol-Gel Method

Authors : O. Çomaklı, M. Yazıcı, T. Yetim, A. F. Yetim, A. Çelik

Abstract : In this study, TiO_2 , ZrO_2 , and TiO_2 - ZrO_2 composite films were coated on Cp-Ti substrates by sol-gel method. Structures of uncoated and coated samples were investigated by X-ray diffraction and SEM. XRD data identified anatase phase in TiO_2 coated samples and tetragonal zirconia phase in ZrO_2 coated samples while both of anatase and tetragonal zirconia phases in TiO_2 - ZrO_2 composite films. The mechanical and wear properties of samples were investigated using micro hardness, pin-on-disk tribotester, and 3D profilometer. The best wear resistance was obtained from TiO_2 - ZrO_2 composite films. This can be attributed to their high surface hardness, low surface roughness and high thickness of the film.

1

Keywords : sol-gel, TiO₂, ZrO₂, TiO₂-ZrO₂, composite films, wear

Conference Title : ICMSME 2017 : International Conference on Materials Science and Mechanical Engineering

Conference Location : Istanbul, Türkiye

Conference Dates : September 28-29, 2017