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Structure, Mechanical and Tribological Properties of ZrCuSiN Coatings Prepared by Reactive Magnetron Sputtering

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Zr based coatings are used in various industrial fields due to their excellent mechanical properties and corrosion resistance compared to other hard coatings. In this study, a ZrCuSiN coating was deposited as a new Zr based coating material. The ZrCuSiN coatings were deposited by magnetron sputtering using a ZrCuSi single alloy target. The influence of the nitrogen gas flow rate in an argon-nitrogen gas mixture on the structure, mechanical and tribological properties of the ZrCuSiN coating were investigated. A single alloy target prepared by arc melting. A ZrCuSi layer (buffer layer) was deposited by non-reactive sputtering processes, under an Ar plasma discharge. Thereafter, ZrCuSiN coatings having various nitrogen contents were deposited by reactive magnetron sputtering. The structural and mechanical properties of the ZrCuSiN coatings were investigated by XRD, SEM, nano indentation and friction test.

Keywords

ZrCuSiN coatings
magnetron sputtering
single alloy target
friction test