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Influence of the oxygen flow rate and substrate temperature on the deposition of crystallised Ti_xO_{2x-1} coatingsFrédéric Lapostolle¹, Yunfang Gui¹, Alain Billard¹¹LERMPS UTBM, Belfort, France

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Magneli phases deriving from titanium, vanadium or molybdenum oxides are known to present interesting tribological properties for low wear applications. In most studies, these phases are obtained by decomposition at high temperature of a nitride coating. However, few papers deal with the direct deposition of magneli phases by controlling the oxygen content.

In this paper, we investigate the deposition of Ti-O coatings as a function of the oxygen flow rate and of the substrate temperature. After a short description of the experimental device used for the deposition, we present relationships between the deposition conditions and the chemical and structural features of the coatings. In particular, the influence of the substrate temperature and the oxygen flow rate are investigated owing to the synthesis of crystallised coatings.

In a second part, the mechanical and tribological properties of the coatings deposited on M2 HSS are presented. Indeed, high load indentation and scratch test are used to characterise the coating brittleness and pin on disc tests are performed to assess the wear resistance of those coatings as a function of their structure.

Keywords

Sputtering

 Ti_xO_{2x-1}

magneli

mechanical properties

structural properties