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Effects of Si Content on Tribo-corrosion Behavior of $\text{Cr}_{1-x}\text{Si}_x\text{N}$ Coatings

Prepared via Magnetron Sputtering

Tao Shao^a, Fangfang Ge^b, Chenrui Pei^a, Feng Huang^b, Deen Sun^{a,c*}, Sam Zhang^d^a School of Materials Science and Engineering, Chongqing University, Chongqing, China 400047^b Key Laboratory of Marine Materials and Related Technologies, Zhejiang Key Laboratory of Marine Materials and Protective Technologies, Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Ningbo, China 315201^c State Key Laboratory of Mechanical Transmissions, Chongqing University, Chongqing, China 400047^d Faculty of Materials and Energy, Southwest University, Chongqing, China 400715**Abstract**

Tribo-corrosion behavior of the magnetron sputtering $\text{Cr}_{1-x}\text{Si}_x\text{N}$ coatings with various Si content was investigated under different testing conditions. The tests were performed using a linear reciprocation ball-on-plate tribometer in the atmosphere, with 3.5 wt.% NaCl and under cathodic protection condition. Though $\text{Cr}_{0.58}\text{Si}_{0.42}\text{N}$ exhibited best wear resistance in tribological test and good corrosion resistance in corrosion test, the tribo-corrosion resistance was not significantly improved. Meanwhile, $\text{Cr}_{0.96}\text{Si}_{0.04}\text{N}$ exhibited the lowest wear rate of $1.5 \times 10^{-15} \text{ m}^3/\text{N m}$ during tribo-corrosion test. It has been found that in the process of tribo-corrosion test, in addition to considering both the corrosion resistance and wear resistance of the coating, more attention should be paid to

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