Effect of Substrate Bias Voltage on Structure and Corrosion Resistance of AlCrN Coatings Prepared by Multi-Arc Ion Plating

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AlCrN coatings are deposited on 316L stainless steel by multi arc ion plating. The effects of different substrate bias voltages on the surface morphology, microstructure and corrosion resistance of AlCrN coating are studied. All the AlCrN coatings exhibit a face centered cubic structure with CrN as the main crystal phase. Moreover, the crystal growth direction has been changed by increasing the bias voltage, where the diffraction peak of (111) is decreased and the diffraction peak of (200) is increased. The surface morphologies show that the micro bumps on the coating surface are decreased, and the exfoliation pits are increased. The corrosion current of AlCrN coating is almost the same for the different bias voltages, but the peeling phenomenon of corrosion surface is reduced as the bias voltage increased.

Keywords: Corrosion resistance; AlCrN; Bias voltage; Multi-arc ion plating

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