DC 스퍼터법과 유도결합형 플라즈마 스퍼터법으로 증착된 HfN 코팅막의 물성 비교연구
A Comparative Study of Nanocrystalline HfN Coatings Fabricated by Direct Current and Inductively Coupled Plasma Assisted Magnetron Sputtering

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초 록: Nanocrystalline HfN coatings were prepared by reactively sputtering Hf metal target with N2 gas using a magnetron sputtering system operated in DC and ICP (inductively coupled plasma) condition with various powers. The effects of ICP power, ranging from 0 to 200 W, on the coating microstructure, corrosion and mechanical properties were systematically investigated with FE-SEM, AFM, potentiostat and nanoindentation. The results show that ICP power has a significant influence on coating microstructure and mechanical properties of HfN coatings. With the increasing of ICP power, coating microstructure evolves from the columnar structure of DC process to a highly dense one. Average grain size and nano hardness of HfN coatings were also investigated with increasing ICP powers.

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A Comparative Study of HfN Coatings Deposited by DC and Pulsed DC Asymmetric Bipolar Magnetron Sputtering

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초 록: Nanocrystalline HfN coatings were prepared by reactively sputtering Hf metal target with N2 gas using a magnetron sputtering system operated in DC and ABPP (asymmetric bipolar pulsed plasma) condition with various duties and frequencies. The effects of duty and frequency, ranging from 75 to 100 % and 5 to 50 kHz, on the coating microstructure, crystallographic and mechanical properties were systematically investigated with FE-SEM, AFM, XRD and nanoindentation. The results show that pulsed plasma has a significant influence on coating microstructure and mechanical properties of HfN coatings. Coating microstructure evolves from the columnar structure to a highly dense one as duty decreases. Average grain size and nano hardness of HfN coatings were also investigated with various pulsed conditions.