

## A Study on the characteristics of TiZrAlN nanocomposite thin films synthesized by CFUBMS

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### 1. 서론

PVD hard coatings such as TiN, TiAlN and CrN have been developed for the improvement of wear resistance and thermal stability [1, 2]. These general-purpose hard coatings, however, have been limited to cutting processes involving high-speed and lubrication-free machining due to the decrease in hardness and oxidation resistance observed at elevated temperatures [3, 4]. Therefore, ternary and quaternary nanostructured hard coatings have recently attracted increasing interest owing to their unique properties, such as lower adhesion of the surface to the friction partner, better oxidation resistance [5].

### 2. 본론

Quaternary TiZrAlN nanocomposite thin films were synthesized by Closed-Field Unbalanced Magnetron Sputtering (CFUBMS), and their microstructural and mechanical characteristics were examined. The grain refinement of the TiZrAlN nanocomposite thin films was controlled by adjusting the N<sub>2</sub> partial pressure.

### 3. 결과

The hardness of the film varied with the N<sub>2</sub> partial pressure and the maximum value was obtained approximately 47 GPa. It was also confirmed that there is a critical value of the grain size ( $d_c$ ) to need maximum hardness.

### 참고문헌

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