

**Industrial application of WC-TiAlN nanocomposite films synthesized by cathodic arc ion plating system on PCB drill.**

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Recently TiN, TiAlN, CrN hardcoatings have adapted many industrial application such as die, mold and cutting tools because of good wear resistant and thermal stability. However, in terms of high speed process, general hard coatings have been limited by oxidation and thermal hardness drop. Especially in the case of PCB drill, high speed cutting and without lubricant process condition have not adapted these coatings until now.

Therefore more recently, superhard nanocomposite coating which have superhard and good thermal stability have developed. In previous works, WC-TiAlN new nanocomposite film was investigated by cathodic arc ion plating system. Control of Al concentration, WC-TiAlN multi layer composite coating with controlled microstructure was carried out and provides additional enhancement of mechanical properties as well as oxidation resistance at elevated temperature. It is noted that microhardness of WC-TiAlN multi layer composite coating increased up to 50 Gpa and got thermal stability about 900°C.

In this study WC-TiAlN nanocomposite coating was deposited on PCB drill for enhancement of life time. The parameter was Al concentration and plasma cleaning time for edge sharpness maintaining. The characteristic of WC-TiAlN film formation and wear behaviors are discussed with data from AES, XRD, EDS and SEM analysis. Through field test, enhancement of life time for PCB drill was measured.