Development of ion plated titanium nitride coatings for metal forming tools.

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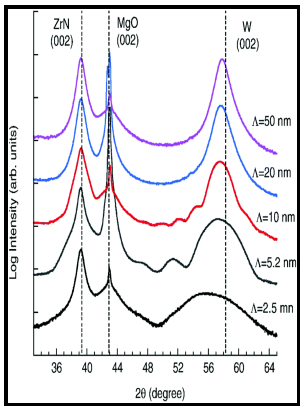

Description: -
-development of ion plated titanium nitride coatings for metal forming tools.
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D35065/81development of ion plated titanium nitride coatings for metal forming tools.
Notes: PhD thesis, Mechanical Engineering.
This edition was published in 1980

Filesize: 24.104 MB

Tags: #A #brief #tutorial #in #Titanium #Ion #Plating

Metallurgical Coatings and Thin Films 1990

The surface pits gradually accumulate tin from the cans, most probably by alloying of the liquid tin phase with the binder phase of a tungsten carbide.

Titanium Nitride (TiN) PVD Coating

To achieve optimized performance, the coating processes are normally subjected to an optimization procedure. Type of coating Titanium nitride TiCN The hardness of the coating is higher than that of TiN coating.

Titanium Nitride (TiN) PVD Coating

Field of the Invention This invention pertains to the general field of protective substances used to coat the cutting surfaces of metal-working tools in order to improve their abrasive performance and longevity. This, in turn, results in the availability of more power at the cutting face of the grinding machine which makes it possible to increase the linear feed rate. In fact, the limiting factor in the life of such tools is typically determined not by wear on the cutting surface but by its break-down and separation from the metal core resulting from failure of the bonding layer.

Titatium Coating Technology

Recognizing the effect of high temperature stresses on the physical integrity of nickel-plated CBN and diamond tools is the critical contribution of this disclosure.

Titanium Nitride

Various processes some of which are still in development can be used to render titanium nitride. In addition, the substrate can be set at an applied potential to accelerate the arriving ionic species, increasing the energetics of the particle collisions with the substrate. BACKGROUND OF THE INVENTION 1.

Titanium Nitride

The titanium ions react with the free nitrogen in the system to form titanium nitride and are implanted at very high speed onto the substrate surface, resulting in a uniform thin layer of high adherence coating. In the CVD process, the materials are placed into a chamber where gas is pumped in at 950 to 1,100 degrees Celsius, allowing a thin layer of TiN to be deposited onto the tools. Additional coating services include organo-metallic chemical vapor deposition CVD , slurry re-coating, air plasma spray coating, and high velocity oxy-fuel HVOF coating.

Titanium

The titanium nitride coating is metallurgically bonded to the body surface and is chemically compatible while having desirable thermal expansion properties. Claims 15 b depositing a titanium nitride coating approximately 2 to 8 microns in thickness over the CBN abrasive particles embedded in said bonding layer in the physical vapor deposition chamber, wherein the deposition is carried out in a nitrogen atmosphere under an absolute pressure between 10 and 30 millitors and at a temperature between 400° and 700° F.

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Under these conditions, the process does not affect the integrity of the steel core of the grinding tool and the titanium nitride or equivalent coating stabilizes and reinforces the existing bond between the cubic boron nitride or diamond and the core, resulting in a grinding tool with greater efficiency and longer life. Cooling is recommended or mandatory at higher cutting speeds.

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