

Hard coatings

Due to their specific application, machining tools must have a very high resistance. To get this important mechanical property, the manufacturers invest a lot in the coating technology to produce very sophisticated hard coatings.

Hereafter are two examples of machining tools, the first one with a single coating, the second with a large number of thin and various layers.

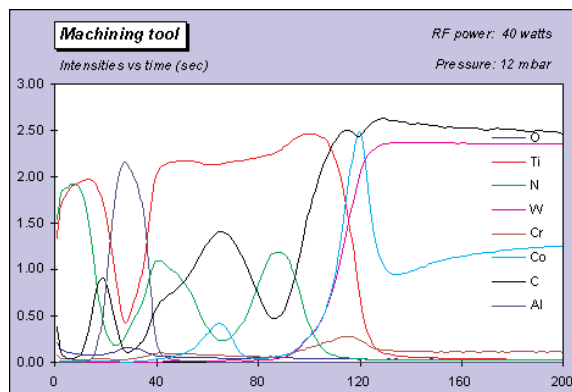
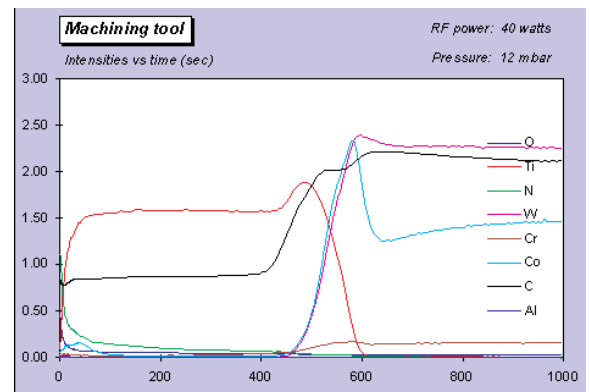
TiCN-TiC COATING DEPTH PROFILE

The qualitative analysis leads to a diagram Intensity (arbitrary unit) vs time (sec).

The sputtering of TiCN - TiC is about 550 sec long. In TiCN layer, Ti remains constant and shows the high stability of the discharge. C is quite constant while N decreases slowly.

The substrate is a tungstene carbide/cobalt material. A large enrichment of Co can be seen at the interface.

The analysis has been achieved with a 4 mm diameter anode. The analytical parameters have been chosen in order to obtain the best depth resolution. The PM voltages are automatically adjusted with the HDD system (HDD: High Dynamic range Detector) during data acquisition.



DEPTH PROFILE OF MULTILAYER COATING
The substrate is similar to the previous one. The coating is more complicated: TiN, TiC, alumina (non-conductive), TiCN - TiC layers with Co and Cr.

Due to the complexity of this multilayer system, it is obvious that the quality control is a very important step in the production process.

This example shows that the optimization of the RF - GDS device allows to identify the whole layers with a good in-depth resolution.

The analysis is performed in 200 seconds