

Effects of Ar:N₂ gas ratio on TiN and TiAlN thin films synthesized via RF magnetron sputtering
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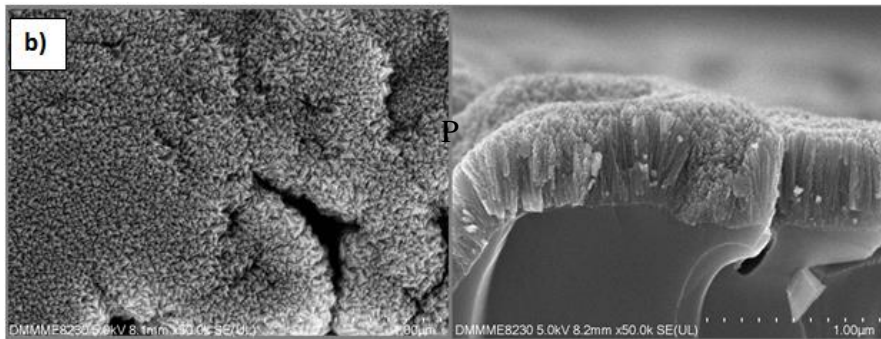


Figure 1. SEM image of the surface (left) and cross-section (right) of 80:20 Ar/N₂ film on rough

Table 1. EDX mapping of the TiAlN film showing a Ti/Al ratio of 1:1.

Element	Weight%	Atomic%
C K	3.51	6.27
N K	23.77	36.36
O K	17.76	23.78
Al K	15.85	12.59
Si K	11.10	8.47
Ti K	28.02	12.53
Total	100.00	

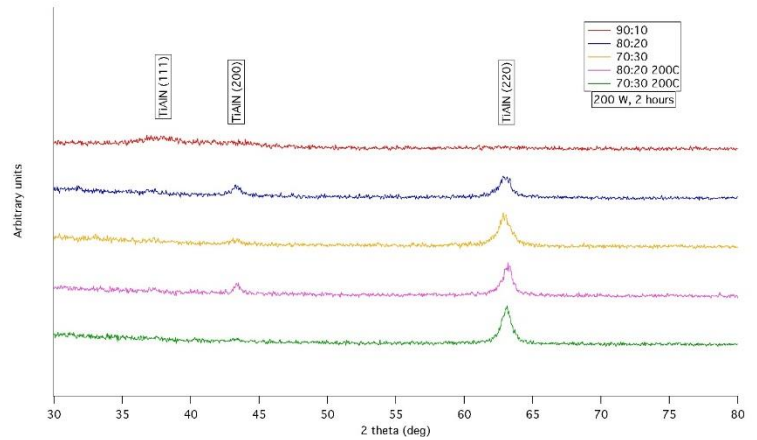


Figure 2. XRD graph of TiAlN films showing preferential orientation to (220) as nitrogen content increases and creating higher peaks when substrate heating is applied. Formation of (200) peaks were also seen on 80:20 Ar/N₂ gas ratio.

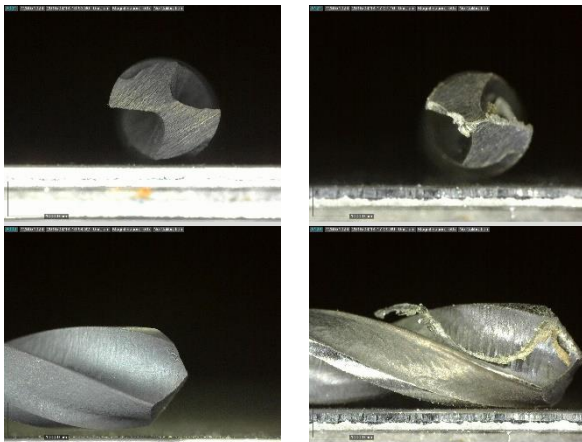


Figure 3. Before (left) and after (right) photos of a 80:20 Ar/N₂ TiN coated drill bit. The sample drilled 140 holes before reaching failure.