

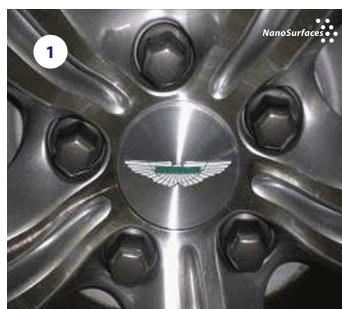
Surface hardening of titanium and its alloys aimed at increasing their resistance to fretting corrosion, wear and grip

One of the main limits of titanium is its scarce resistance to fretting corrosion.

In order to reduce these phenomena (as well as to improve titanium anti-grip properties) new surface treatments were developed, based on Anodic Spark Deposition, intended to generate a fairly thick, compact titanium oxide film exhibiting enhanced surface hardness, which would improve the considered properties (11).

The so obtained thick oxide also shows an insulating behaviour.

TiHard™ treatments are currently applied in high-level automobile industry to produce **motor components** (1-3), nuts and bolts, in **aeronautics** (4-6),



and in **fashion accessories** (7-10).

These surface treatments have also found applications in **biomedical** field to produce endomedullary nails or modular hip prostheses, where the presence of multiple conical (morse taper) connections among the different components can lead to an excessive release of particles and metallic ions due to fretting corrosion phenomena, together with a decrease of fatigue resistance.



| | Ti6Al4V | TiHard™ |
|-----------------------|----------|----------|
| HV (Vickers Hardness) | 451 ± 29 | 967 ± 34 |