



TITANIUM NITRIDE PLASMA COATING

Instruments produced by Nexxgen Biomedical[®] are designed and produced using the highest quality standards. This ensures that the instruments exhibit optimal wear-resistance, sharpness, and corrosion protection throughout the life of the instrument. For these reasons, special materials and processes are sometimes utilized to ensure optimal instrument performance. One of these processes is titanium nitride plasma coating. Titanium nitride plasma coating is used across many different fields of manufacturing such as aerospace, automotive, and medical to improve material properties and behaviors of stainless steel. [1][2]The titanium nitride plasma coating process deposits a thin layer of titanium nitride on top of surgical stainless steel; for dentistry mainly AISI 420 martensitic stainless steel is used due to its hardness and strength. During the nitriding process, nitrogen gas is introduced into a chamber of titanium tetrachloride. The reaction of these gases produces high energy plasma which creates titanium nitride. The titanium nitride is bonded to stainless steel during this process. [3]

Hardness

The hardness of an instrument is extremely important because it is what allows the instrument to keep a consistent cutting edge throughout the life of the instrument. If an instrument is too soft, the edge will easily deform, leading to poor cutting efficiency. Titanium nitride is an ultra-hard material whose hardness ranges between 2000 to 25000 (HV) which is significantly harder than stainless steel. [4]

Biocompatibility

Titanium nitride is a popular choice among dental implant instrument manufacturers because of its biocompatibility with the human body. Like pure titanium, the body has almost no immune reaction to titanium nitride, making it safe around wounds as well as dental implants. [5]

Wear Resistance

One of the most important advantages of titanium nitride plasma coatings is that it greatly increases the wear resistance of the instrument. This means that the instrument can perform longer without the need to be sharpened. This keeps your cutting edges sharp even after extended use. [6]

Corrosion Resistance

During the plasma coating process, an extremely smooth surface of titanium nitride is deposited. This protects the steel from external sources of corrosion. This makes titanium nitride optimal for use with the high carbon steel. [7]

Citations

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