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## **The Effect of Hot-wire on the Plasma of Magnetron Sputtering and the TiN Coatings**

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Tungsten hot-wires were used to improve the density of magnetron sputtering plasma. The emitted electrons from tungsten wires were directly decided by the currents and potentials applied to them. The emitted electrons bombarded with argon and nitrogen and the plasma densities were enhanced due to the discharge and ionization. The substrate bias potentials took the role to attract the ions from the plasma to the growing coatings. The adatoms on the substrates absorbed energies from the arrival ions and the dense coatings were produced. Therefore, the morphology structures of TiN coatings changed from triangular to sphere. The hardness of the TiN coatings were up to 25 GPa, and the adhesion between coatings and substrate were from 10 to 70 kgf.

### **Keywords**

hot-wire  
plasma  
magnetron sputtering  
coatings