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**Mechanical properties and biocompatibility of TaOxNy thin film coatings**

Jang-Hsing Hsieh¹, Yi-Hwa Lai²

¹Ming Chi University of Technology, New Taipei City, Taiwan  ²Ming Chi University of Tech, New Taipei City, Taiwan

jhhsieh@mail.mcut.edu.tw

The tunable TaOxNy thin film coatings were studied systematically on their mechanical properties as well as their biocompatibility, in terms of O/N ratio. Mainly, it is believed that Ta-based coatings are known to be biocompatible with good mechanical property and corrosion resistance. According to the preliminary studies and published literatures, it can be summarized that the incorporation of small amount of oxygen may be beneficial to the improvement of mechanical properties. As for biocompatibility, it is not quite understood the relationships among O/N ratio, surface properties, and bio-reactions. However, it is generally agreed that biocompatibility depends mainly on surface topography and functionality, with the minimization of wear and corrosion. Therefore, it is important to study the effect of O/N ratio on surface topography, surface energy, provided that wear and corrosion are minimized. The effects of O/N ratios on the mechanical and biocompatible behaviors for the tunable TaOxNy thin films were studied. It is found that small amount of oxygen caused the increase of hardness and H/E ratio, and made the surface rougher, which is beneficial for the cells to adhere and grow on the film’s surface. How O/N ratio affects surface and structure’s chemo-physical properties and functionality, and eventuality the biocompatibility are discussed.

**Keywords**

Mechanical
Biocompatibility
Oxynitride
TaOxNy