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Author Tsung-Jen Han
Author's Email Address No Public.
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Abstract
The artificial joints have evolved from high mechanical reliability and best bioactive, in order to produce a good interface bonding quality between the implant and contact tissues. The HA coating on Ti alloy with laser cladding were satisfied requirement described above. In this research, Ti-6Al-4V was adopted as the substrate, the coating materials including, and adhesive were to part sodium silicate (WG) and polyvinyl alcohol (PVA), then used Nd:YAG laser proceeded coating. The experimental results revealed that the weld surface width, penetration depth and HAZ will become increase with welding speed decrease. When adhesive used WG, the weld morphology was serious to convex, and induced more porosity in the weld. When adhesive used PVA, the weld had the crack. With laser power effect, in the high laser power (1150W), the Ca/P value of PVA adhesive coating layer tend to increase, but it shows no obvious difference for the WG. With the increase of welding speed, the Ca/P value decreases. Wrap the chemical composition looks of coating layer and is mainly HA, $CaTiO_3$, $Ca_2P_2O_7$, $CaCO_3$, $TiO_2$, and use WG for the combines, there is formulation of $SiO_2$ compound, and that produce $SiO_2$ and $Si_2Ti$ in the transition layer. On the hardness measurement, regard the specimens used WG adhesive, its coating layer and transition layer's hardness are higher than regarding the specimens used PVA adhesive. And the transition layer's hardness for two kinds of adhesive is far higher than substrate. The hardness experiment with the interface in the transition layer to HA coating layer, the result reveals the crack has not been prolonging the interface has grown up, prove that has certain combination intensity to coating layer and transition layer by laser cladding. In addition because melting point of WG far higher than PVA, while using WG to be adhesive, that is relatively high too to succeed in finishing the heat energy that coating needs.
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