
Improvement of heat dissipation characteristics on PEO-treated Al6061 alloy with BNNT

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This study investigated how to enhance heat dissipation characteristics on Al6061 alloy by using plasma electrolytic oxidation (PEO) process. For this purpose, a train of anodic currents were applied to KOH-based electrolytes with either carbon nanotube (CNT), or various weight percent of boron nitride nanotube (BNNT) at a current density of 100 mA/cm². Thickness of coating was adjusted to be constant to exclude the characteristic value difference according to the thickness. Microstructural observation by SEM exhibited that the mean pore size decreased with increasing the concentration of BNNT. Compositional analyses were carried out with energy dispersive X-ray spectroscopy. It is however interesting to note that the patterns of X-ray diffraction showed no changes of compositions of all coatings, regardless of the concentration of BNNT in the electrolytes. The surface roughness of the PEO-treated samples was examined by means of a non-contact optical 3D surface measurement equipment. Also Fourier transform infrared spectrometer was conducted to measure the thermal emissivity of samples. As a result, heat dissipation properties of oxide layer with boron nitride nanotubes was enhanced than with carbon nanotubes.

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