Effects of Gas-mixed Electrolyte on Leveling Ability of Electrochemical Machining of ($\gamma+\alpha_2$ +B2) TiAl Intermetallic

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Genetic error is an important factor that affects the electrochemical machining (ECM) accuracy of ($\gamma+\alpha_2$ +B2) TiAl intermetallic. Investigations have shown that the effect of genetic error can be reduced by appropriately increasing the leveling ratio. This study aimed to improve the leveling ability by using gas-mixed electrolyte. A high-speed camera was employed to observe the bubble distribution of the gas-mixed electrolyte in the machining gap. Experimental investigations verified that the leveling ratio increased from 0.49 to 0.74 as the void fraction increased from 0% to 70% and almost increased by 51% with the gas mixed into the electrolyte during ECM. Furthermore, the surface roughness value changed from 0.6481 to 0.2682 when the void fraction varied from 0% to 70%, implying that the use of gas-mixed electrolyte during ECM improves the surface quality of a workpiece.

Keywords: ECM, gas-mixed electrolyte, leveling ability

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