Short Communication

Effects of Microelectrochemical Milling Parameters on the Microstructures of Co40CrNiMo

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Microparts made of highly elastic alloys are increasingly applied in many industries, including aeronautics and astronautics, precision devices and so on. However, it is difficult to machine these parts with traditional machining technologies. To solve this problem, nanosecond-pulsed microelectrochemical milling technology is applied to machine microparts out of highly elastic alloys. In this paper, the effects of the main process parameters, namely, the machining voltage, the pulse duration, the electrolyte concentration and the feed rate on the machining accuracy are systematically studied, and then microelectrochemical milling experiments for three typical microstructures from a highly elastic alloy of Co40CrNiMo are carried out. The study shows that a rough electrochemical milling coupled with a finish electrochemical milling using proper parameters can be applied to machine microparts from the difficult-to-machine Co40CrNiMo alloy. The experimental results show that within reasonable ranges of these parameters, the machining accuracy of the microstructures from Co40CrNiMo decreases with increasing working voltage, pulse duration and electrolyte concentration but increases with increasing feed rate. This study provides a probable solution for machining microparts from difficult-to-machine highly elastic alloy materials.

Keywords: Highly elastic material; Microelectrochemical milling; Microelectrode; Nanosecond-pulsed power

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