Effect of heat treatment on erosive wear behaviour of Ti6Al4V alloy

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Abstract
In this paper, the erosive wear behaviour of Ti6Al4V alloy depending on various heat treatment conditions was evaluated. It is aimed to understand the relationship between the microstructure and the erosion rate of Ti6Al4V alloys. Furthermore, the hardness and the surface morphology variations depending on the annealing parameters and the effects of these parameters on the erosion behaviour of the annealed Ti6Al4V alloy were also considered. Moreover, eroded surfaces of samples were examined by using a scanning electron microscope in order to understand dominant material removal mechanisms depending on the annealing parameters. Results showed that the aging process has dramatically affected the erosion resistance of Ti6Al4V alloy. The microstructure and the hardness of the samples have significantly affected the erosion resistance of the alloy. Surprisingly, erosion resistance decreased when the hardness increased. Finally, SEM investigations of the eroded surfaces of the heat treated samples showed that microcutting and microploughing were the dominant erosion mechanisms occurred during the erosion process.

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