

Isothermal and Cyclic Oxidation of the Ti-6Al-4V Alloy

Authors : Poonam Yadav, Dong Bok Lee

Abstract : In this study, the Ti-6Al-4V alloy was isothermally and cyclically oxidized at 800°C for 40 hours in air, and its oxidation behavior was characterized in terms of its oxidation rate, scaling rate, and scale spallation tendency. The isothermal oxidation tests indicated that Ti-6Al-4V oxidized fast and almost linearly, forming thick oxide scales. However, the scales that formed during isothermal oxidation were adherent. The cyclic oxidation tests indicated that the scales that formed on Ti-6Al-4V were highly susceptible to spallation owing to the large growth stress arisen and the thermal stress imposed during thermal cyclings. The formed scales frequently delaminated into several pieces owing to the excessive stress aroused by the repetitive thermal shock. Particularly, excessive oxidation and heavy spallation occurred at the edge of Ti-6Al-4V during cyclic oxidation.

Keywords : cyclic, isothermal, oxidation, spallation

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