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High temperature sliding wear of Inconel 718 against silicon nitride and alumina

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In closed cycle gas turbine, turbine blades are subjected to severe wear because of high contact temperature and pressure. Inconel 718 is used as a blade material for closed cycle gas turbine applications; however, its friction and wear properties have been studied fully under high stress and high temperature conditions. Friction and wear behavior of Inconel 718 against silicon nitride and alumina have been studied under dry sliding conditions in temperature range of 40-500°C using ball-on-disc universal tribometer. For sliding distance test the wear rate of Inconel 718 with alumina is less than silicon nitride for the entire range at 500°C. The wear volume of Inconel 718 increases with the increase in sliding distance increases from 200 m to 1000 m against alumina and silicon nitride. For Inconel 718 highest coefficient of friction (μ) of 0.88 and 0.52 against alumina and silicon nitride was obtained at 10 N, whereas minimum μ of 0.45 and 0.40 against alumina and silicon nitride was obtained at 20 N, these tests carried out at 500°C. For temperature test highest coefficient of friction (μ) 0.75 at 400°C and lowest μ 0.46 at 200°C against silicon nitride whereas highest coefficient of friction (μ) 0.88 at 200°C and lowest μ 0.54 at 500°C against alumina. Optical microscopy, SEM, EDXA, and 3-D profilometery have been used to understand the friction and wear mechanism of tribopair. From these observations it is concluded that wear of Inconel 718 is minimum

Biography

Mohd Farooq Wani has expertise in the Field of Life Cycle Engineering Design and Tribology. He possesses 35 years of teaching and research experience at UG, PG and PhD level. His concept of sustainability design of mechanical systems through innovative tribological applications is unique contribution in the development of sustainability design of mechanical systems. He has guided more than 50 theses at PG level in the Field of Tribology and Life Cycle and has successfully guided 6 PhD theses in the Field of Tribology and LCD. He has published 50 research papers in international journals and more than 40 publications in international conference proceedings.

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