

Friction and Wear Behavior of Zr-Nb Alloy Under Different Conditions

Authors : Bharat Kumar, Deepak Kumar, Vijay Chaudhry

Abstract : Zirconium alloys are generally used for designing the core components of nuclear reactors due to their good mechanical and tribological properties. Some core components are subjected to flow-induced vibrations resulting in wear of these components due to their interaction with one another. To simulate these conditions, low amplitude reciprocating wear tests are conducted at room temperature and high temperature (260 degrees Celsius) between Zr-2.5Nb alloy and SS-410. The tests are conducted at a frequency range of 5 Hz to 25 Hz and an amplitude range of 200 μm to 600 μm . Friction and wear responses were recorded and correlated with the change in parameters. Worn surfaces are analysed using scanning electron microscopy (SEM) and optical profilometer. Elemental changes on the worn surfaces were determined using energy dispersive spectroscopy (EDS). The coefficient of friction (COF) increases with increasing temperature and decreases with increasing frequency. Adhesive wear is found to be the dominant wear mechanism which increases at high temperature.

Keywords : nuclear reactor, Zr-2.5Nb, SS-410, friction and wear

Conference Title : ICTIE 2023 : International Conference on Tribology and Interface Engineering

Conference Location : Amsterdam, Netherlands

Conference Dates : May 04-05, 2023