INSTITUT FÜR TECHNOLOGIEN DER METALLE
MATERIALS SCIENCE AND ENGINEERING

Universität Duisburg-Essen, **Werkstofftechnik**

Lotharstr. 1, 47057 Duisburg

UNIVERSITÄT DUISBURG ESSEN
Open-Minded

Master thesis

Cavitation erosion behavior of oxygen diffusion layer (ODL) on the surface of titanium

Introduction

Cavitation erosion is a form of mechanical surface damage that occurs on the surface of components exposed to the cavitation, i.e., the formation and collapse of bubbles in a fluid. The development of materials and coating could increase the life of components exposed to cavitation erosion. Among other coating techniques, thermal oxidation is a simple and environmentally friendly method that has been used to improve the wear behavior of titanium alloys. High-temperature processing of titanium in atmospheric conditions results in the formation of an oxygen diffusion layer (ODL) covered by titanium oxide (TiO_2, rutile). The hardness and thickness of ODL are highly dependent on the heat treatment time and temperature.

Aims

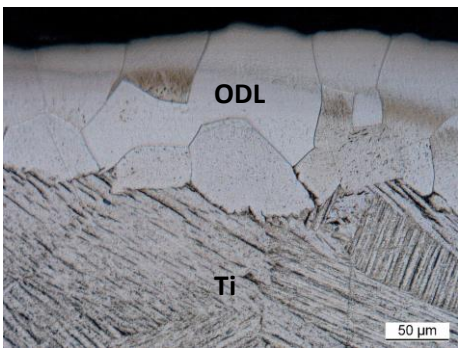
- ✓ Investigation of erosion resistance of ODL under ultrasonic cavitation
- ✓ Effect of heat treatment temperature on the cavitation erosion behavior of ODL

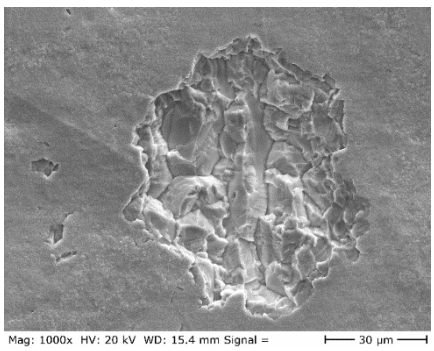
The work

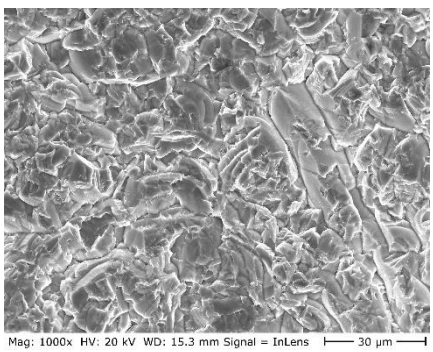
1. Literature review
2. Sample preparation
3. Heat treatment
4. Characterization of heat-treated samples (metallography, microhardness, SEM)
5. Ultrasonic cavitation erosion tests
6. Surface and subsurface studies (SEM and confocal light microscopy)
7. Evaluation and interpretation of the results, writing the thesis.

Your profile

- ✓ You are interested in research and experimental works.
- ✓ You have an interest in materials science (metals).
- ✓ you are completing your master's degree in material science, engineering, or natural science.







Contact: **Morteza Abedini,** Phone: 0203/379 3058, Email: **morteza.abedini@uni-due.de,** Room: MB 127