Fraunhofer KIT Karlsruher Institut für Technologie
MIKROTRIBOLOGIE CENTRUM µTC

IAM Institute for Applied Materials

MASTERTHESIS

Development of a method for analyzing large cross sections with scanning electron microscopy

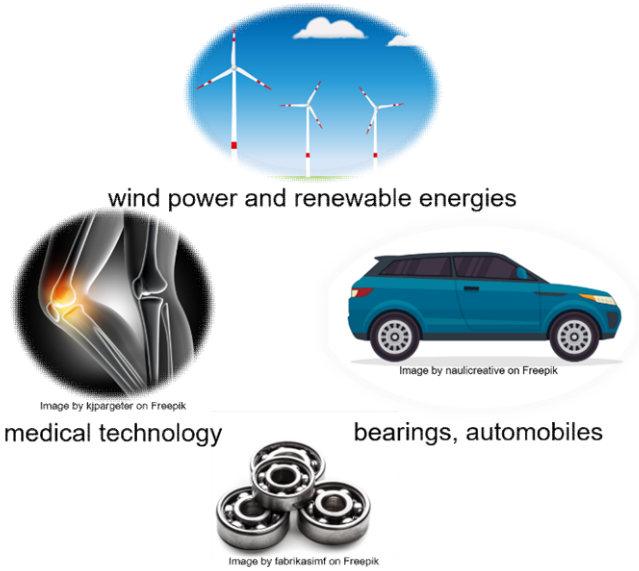
Background

About 23% of the world‘s energy demand currently stems from friction and wear in mechanical systems such as cars. By optimizing the materials, surfaces and lubrication used, these losses can be reduced by up to 40% in the long term and thus make a significant contribution to the sustainable use of resources and the reduction of emissions. [1]

To achieve this, a better understanding of the underlying tribological mechanisms is necessary. An important aspect here is the greatly accelerated oxidation of components under tribological load, which often has a negative effect on friction behavior and wear. In order to understand the processes taking place, high-purity copper is examined as a model material.

Tasks

Within the scope of this experimental work, large-area cross-sections of the stressed sample areas are to be created with the help of ion etching in order to be able to characterize the microstructure with the help of scanning electron microscopy methods and to be able to analyze its development.

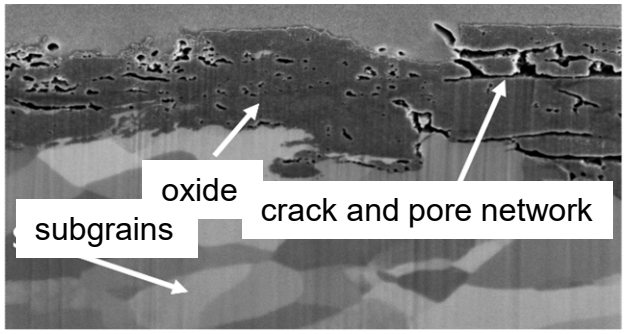


Examples for tribological systems in daily life.

Requirements

- Studies in mechanical engineering, materials science or similar
- Good knowledge of materials science
- Previous knowledge in the field of tribology is not mandatory
- conscientious and independent way of working as well as interest in experimental work are key

Possible start: immediately



Mikrostructure in copper after tribological loading.

Contact

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[1] Holmberg, K., Erdemir, A. Influence of tribology on global energy consumption, costs and emissions. *Friction* **5**, 263–284 (2017).