

LABORATORY OF TRIBOLOGY

at the Structural Ceramics Department

Laboratory of tribology performs testing and evaluation of friction and wear of materials.

Equipment

High Temperature Tribometer, by CSM Instruments

Measuring method: Pin-on-disc;
Dry sliding or in lubricant;
On air or short testing in protective atmosphere

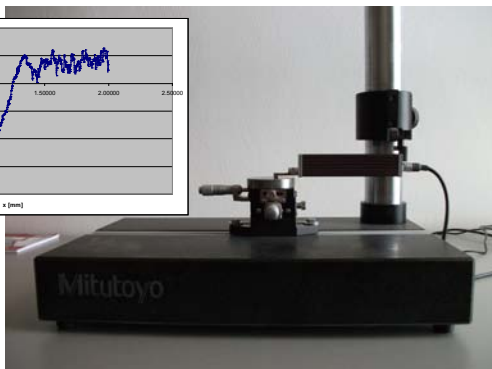
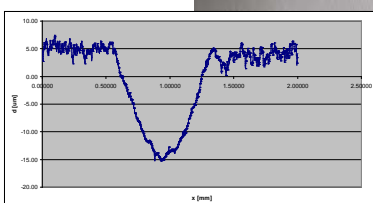


Technical specifications

- Ball: 6 mm diameter
- Steel, hardmetal, Al_2O_3 , Si_3N_4 , ZrO_2
- Static loading: 0.1 – 10 N
- Maximum friction force: 10 N
- Friction force resolution: 5 mN
- Temperature: up to 800 °C (up to 1000 °C with auxiliary furnace), $\pm 3^\circ\text{C}$
- Rotation:
 - Rate: 0,3 – 500 rpm
 - Maximum diameter: 30 mm
 - Maximum torque: 450 mN.m
- Output: friction coefficient, wear depth

Quantification by profilometry and microscopy:

- Stylus profilometer Mitutoyo SJ-201
 - roughness and line profiles
 - resolution 0.01 μm



- Measuring optical microscope with PC workstation

THIN SOLID FILMS LABORATORY

at the Structural Ceramics Department

Thin Solid Films laboratory performs research and development of hard and wear resistant tribological coatings.

Equipment

Hybrid PVD/PE CVD system



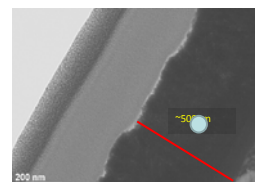
Technical parameters

- Electron Beam Gun – Output max. 10 kV/1.2A
- Magnetron with 10 cm diameter 1kW/ 13,56 MHz
- Sublimator
- Bias max. 5 kV/ 3 A
- Gas filling system Ar, N_2 , C_2H_2 , H_2
- Rotating and planetary movement
- High rate of deposition 0.01 - 10 $\mu\text{m}/\text{min}$

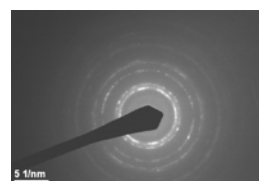
Activities

- Preparation of transition metals nitrides and carbides coatings
- Development and research of nanocomposite WC/C and CrC/C systems prepared by PE CVD method from organometallic precursors

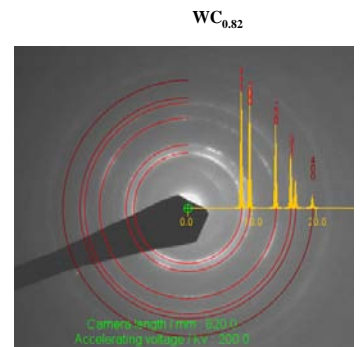
TEM + microdiffraction



WC coating on high-speed steel (FIB prepared sample)



SAED pattern from the coating area (marker)



Identification of SAED pattern (JEMS software)

Microdiffraction patterns showing nanocrystalline character of deposited thin films.