Laboratory of light microscopy

(study of microstructure and defects in a wide range of materials by means of light microscopy)

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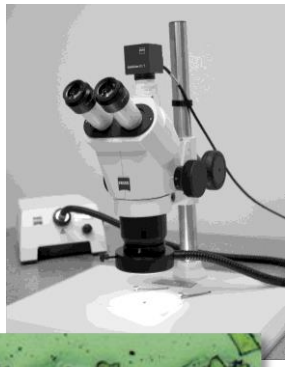
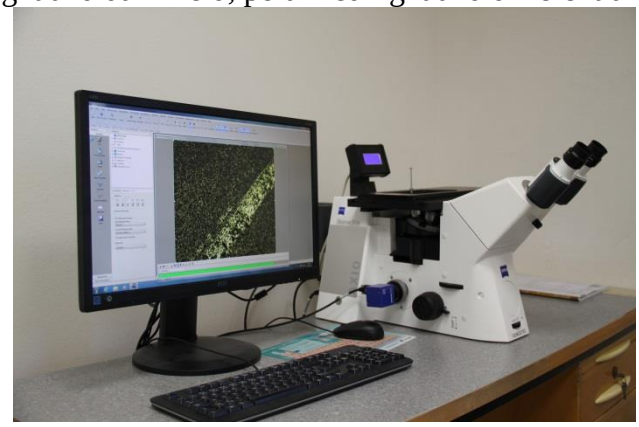
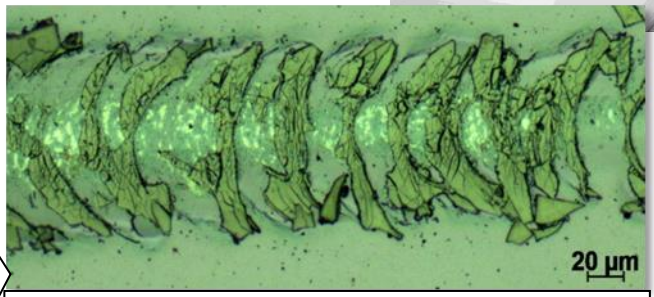
Laboratory is oriented toward the investigation of the internal structure and microstructure of a wide range of materials for the needs of its fast observation in the magnification range from 10 x up to atomic resolution using a combination of various techniques. The basic tool is the conventional bright and dark field light microscopy, in polarized light and differential interference contrast with the user friendly and high resolution digital image recording. Conventional light microscopy is combined with the confocal microscopy/optical profilometry based on ptical interference for fast study of 3-dimensional surface topography over wide range of magnifications and focusing depths. The other techniques involve an upright light microscope combined with Raman spectrometer for the determination of local molecular bonds and an atomic force microscope (AFM) for extremely high magnifications and even atomic resolution.



1. **Stemi 2000 C,** stereomicroscope, (Carl Zeiss, Nemecko) **–** for fast observation of the objects within the magnification range 0.65 - 50 x with CCD camera and focusing distance up to 92 mm.

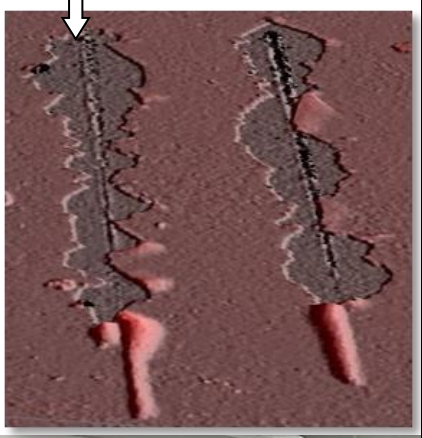
2. Axio Observer 1M, inverted optical microscope (Carl Zeiss, Nemecko) **m**odern light microscope with the magnification range 25x – 1000x operating in bright and dark field, polarized light and differential interference contrast (DIC) regimes.





The details of the scratch track after scratch test in a thin coating on a steel substrate using light and confocal microscopy.

3. Neox Plu, confokal microscop/optical profilometer (Sensofar, Španielsko) – for the observation and measurement of the parameters of rough surfaces in a magnification 50 – 1500 x with high resolution in Z axis which is suitable for fast measurement of surface roughness (point, line, surface analysis) and cross section profiles (e.g. on wear tracks scratch tests, indentation tests) and coating thickness.



4. XploRA, Raman microscope, (Horiba Yvon Jobin, Francúzsko) - advanced disperse Raman microscope with three lasers with different wavelength, frour gratings, spectral resolution <3,4 cm^{-1}, with fast and automatic mapping and evaluation software based on an upright light microscope for the observation in bright and dark field regimes.