LEICA 1000
Power Optical Microscope

for Electrical Failure Analysis Laboratory in ONPY

Subject:

Introduction on Refurbished Leica microscope for analytical purposes

Content:

Description of the tool and work performed

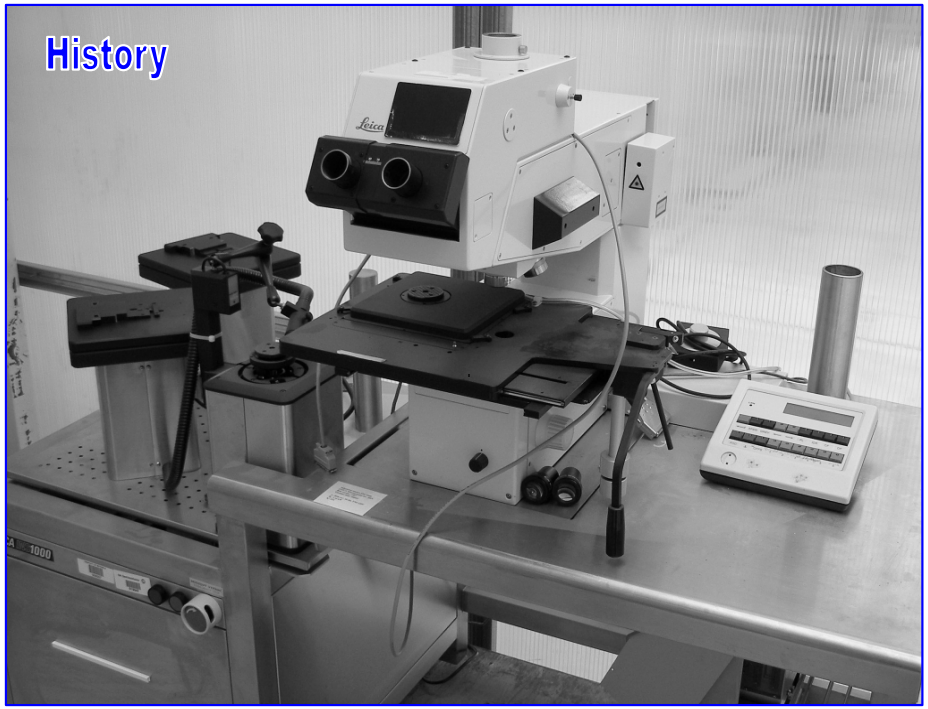
Reference documents

N/A

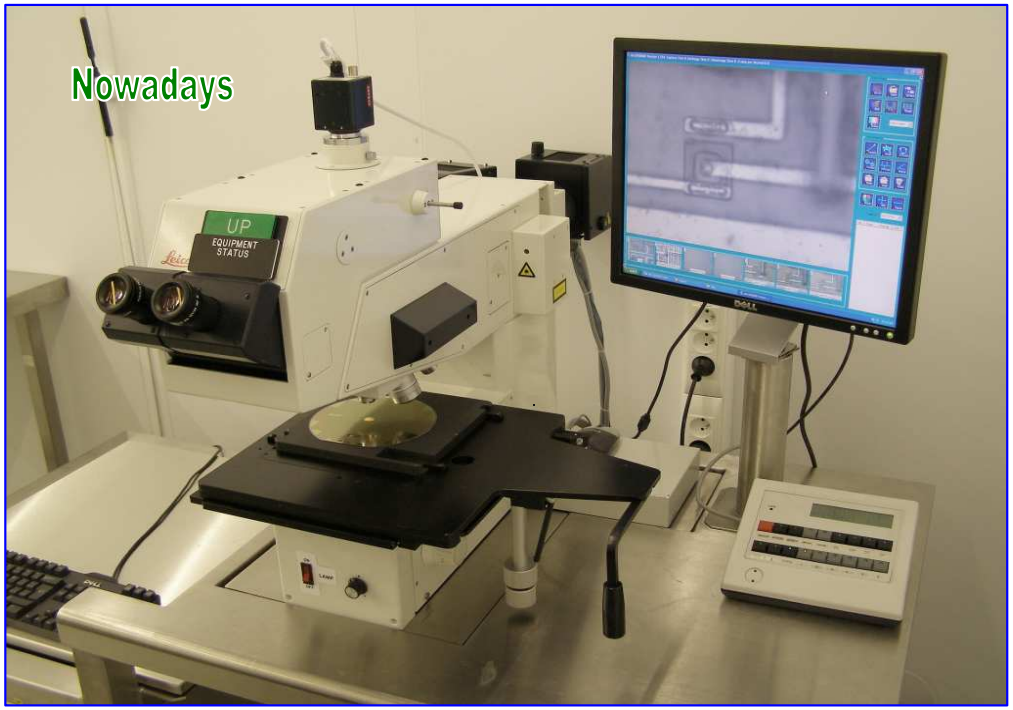
EFA laboratory, ONPY2
Written by V. Kulikov in 6 June 2008

ON Semiconductor
Piestany, Slovakia

Before and Now *(outline)*



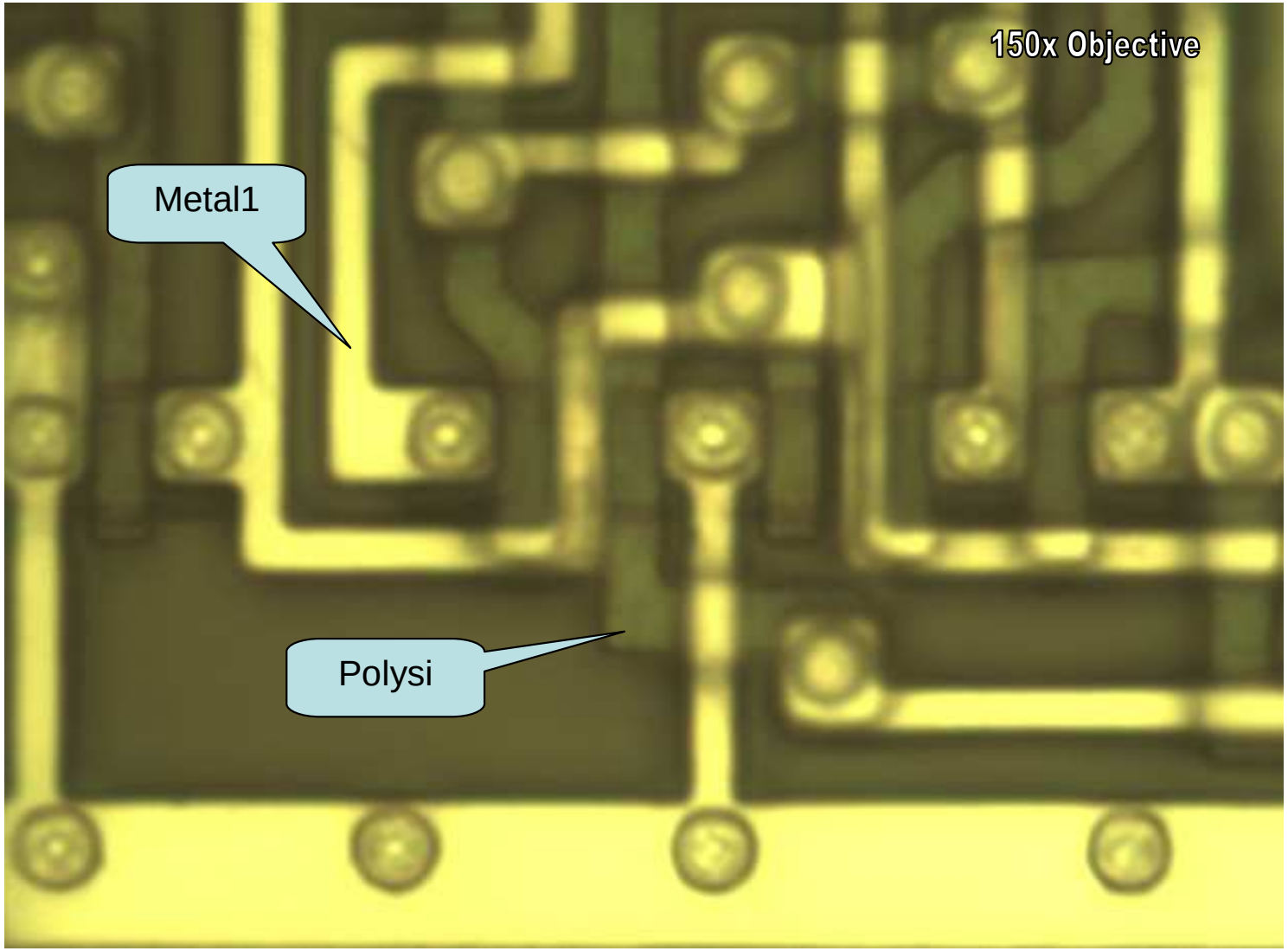
- Burned controller Board (Basic module)
- Missing Robot (not required for analytical purposes)
- Missing 50x, 100x objectives and oculars
- Broken image mirror selector
- Broken Aperture selector
- Broken halogen lamp power source,
- missing UV source, broken UV housing



- Repaired (Jozef Kovacik jr.) *
- Removed
- Used older objectives with adaptation rings *
- Repaired (Jozef Kovacik jr.) *
- Repaired (Jozef Kovacik jr.) *
- Repaired (Jozef Kovacik jr.) *
- added new, housing fixed
- installed 5 Megapixel CMOS camera, PC + accessories

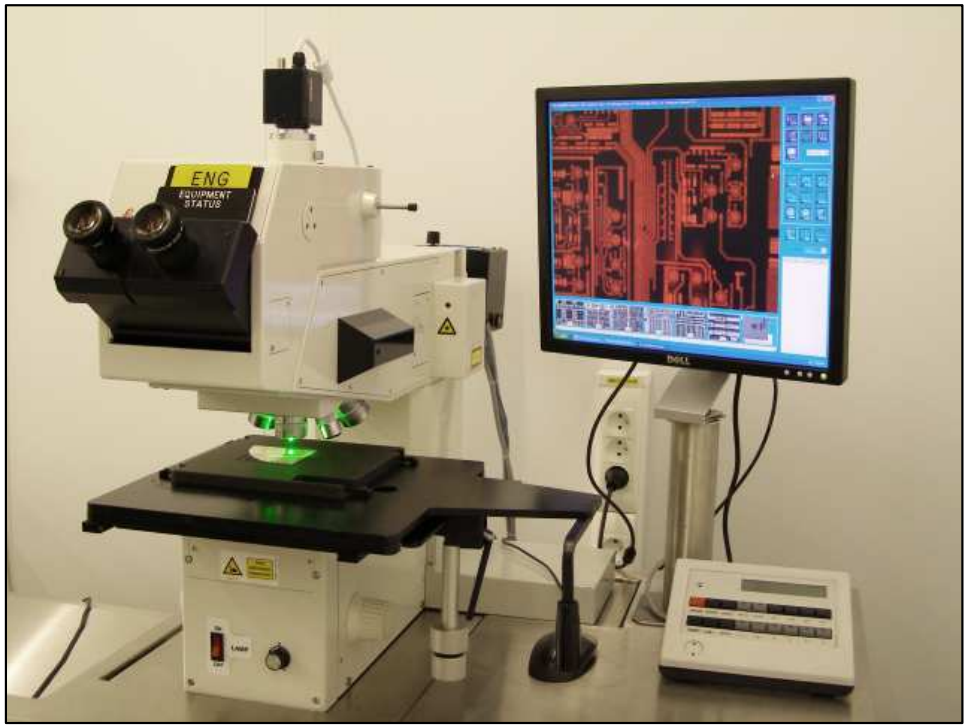
** details can be found in Background section of this report*

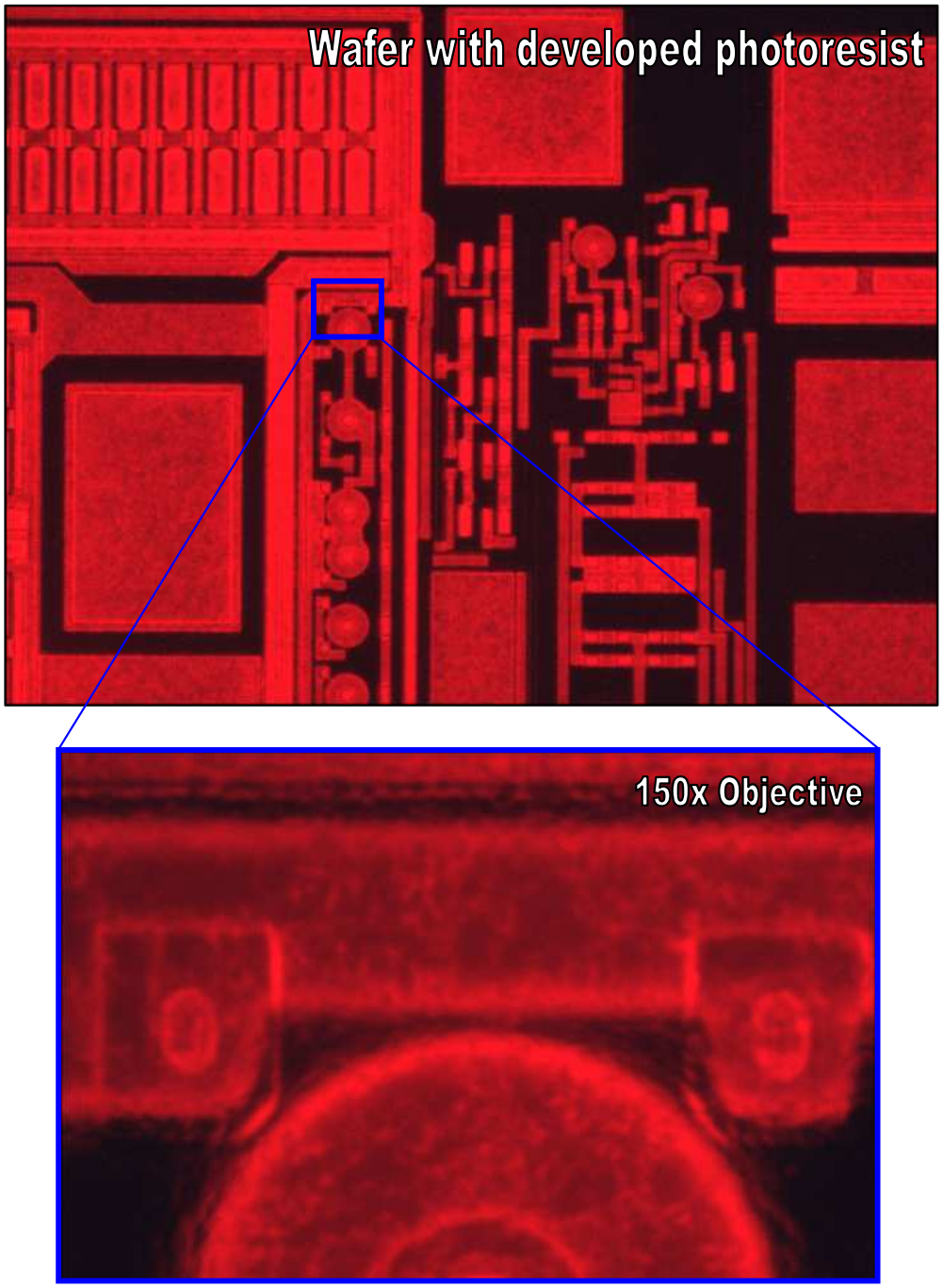
Optical Inspection Mode *(example on PowerSense 5B technology)*



- Available objectives: 2.5x, 20x, 50x, 80x, 150x

Fluorescence mode





- UV Source Hg Lamp
- Available objectives: 10x, 20x, 50x, 80x, 150x

Wikipedia: Fluorescence is a luminescence that is mostly found as an optical phenomenon in cold bodies, in which the molecular absorption of a photon triggers the emission of another photon with a longer wavelength. The energy difference between the absorbed and emitted photons ends up as molecular vibrations or heat. Usually the absorbed photon is in the ultraviolet range, and the emitted light is in the visible range, but this depends on the absorbance curve and Stokes shift of the particular fluorophore. Fluorescence is named after the mineral fluorite, composed of calcium fluoride, which often exhibits this phenomenon.

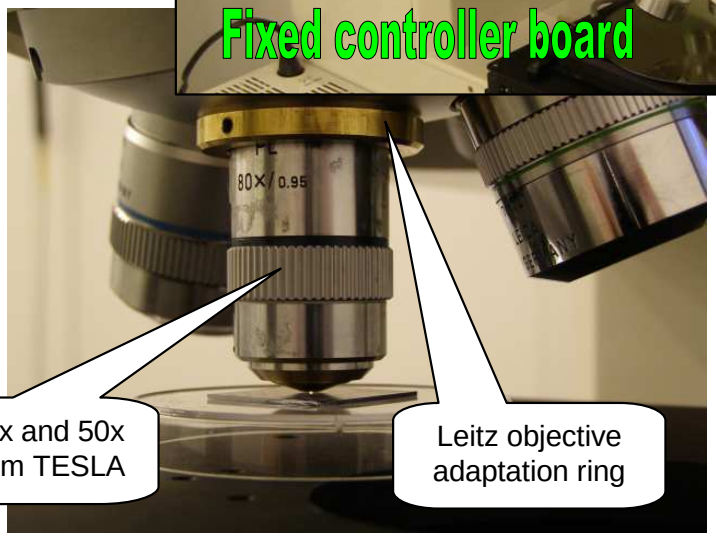
Background

LEICA microscope – Refurbishing I

- Repaired burned controller Board for
  - 5 USD
  (replaced three OPAMPs, 5 USD)
- Missing robot, remaining parts removed (parts could be used as spare parts for production tools). Robot area covered by steel platform for sample storage
- Designed and produced adaptation rings for old DDR Leitz objectives 50x and 80x, added spare oculars
  - 50USD
  (in house production of rings ~100USD)
- Fixed broken image mirror selector
  - Zero material costs
- Fixed broken Aperture selector
  - Zero material costs
- Broken halogen lamp power source, missing UV source
  - Zero material costs

Detailed information on refurbishing work can be found in Equipment presentation from J. Kovacik jr.

Equipment Details



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Equipment Details

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LEICA microscope Refurbishing II

- Obtained 150x DF objective
  - Zero material costs
- Modified stage arm
  - Zero material costs
- Installed fluorescent UV mode
  - 360 USD
- 5MP CMOS camera + accessories
  - 1100 USD
- 2D Measurement Software
  - 450 USD
- Self designed microscope stage for fitting wafers (vacuum), SEM sample holders, DIP packages and other analytical samples. Note: adapted idea on vacuum distribution network from Cascade.
  - 150 USD