



دانشگاه شیراز *Department of Materials Science and Engineering*

OPTICAL MICROSCOPY LABORATORY

Analytical instruments



Shiraz University



ANALYTICAL INSTRUMENTS

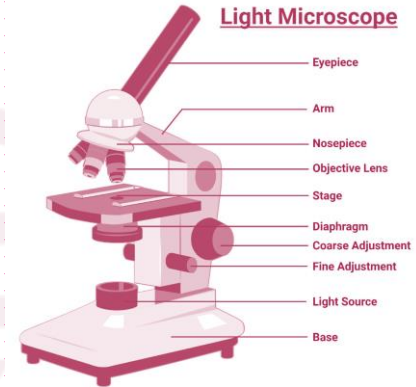


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Optical metallographic microscopes

Introduction

Metallographic microscopes are used to identify defects in metal surfaces, to determine the crystal grain boundaries in metal alloys, and to study rocks and minerals. This type of microscope employs vertical illumination, in which the light source is inserted into the microscope tube below the eyepiece by means of a beam splitter. Light shines down through the objective and is focused through the objective onto the specimen. The light reflected or scattered back to the objective is then imaged back at the eyepiece. In this manner, opaque objects such as metals can be examined under the microscope. Such systems also have applications in forensic science and diagnostic microscopy. This lab is equipped with several microscopes which their specifications will be introduced.



Schematic figure of an optical microscope

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Device: Optical microscopes

Manufacturer: *LEITZ*



Technical specifications

Magnification

50-500

Device: Optical microscopes

Manufacturer: *MOTIC*



Technical specifications

Magnification

100-400

Device: **Optical microscopes**

Manufacturer: *NIKON*



Technical specifications

Magnification

50-500

Device: **Inverted optical microscopes**

Manufacturer: *KRUSS*



Technical specifications

Magnification

50-500

* **Inverted, hence beneficial for large-sized samples**

Device: Stereo microscope

Manufacturer: UNION



Technical specifications

Magnification **7.5-45**

* **Observation of the surface topography of the samples**

Device: Transmission light microscope

Manufacturer: CARL ZEISS



Technical specifications

Magnification **50-500**

* **Observation of the transparent samples**



Device: Polarized light microscope

Introduction

Polarized light is a contrast-enhancing technique that improves the quality of the image obtained with birefringent materials when compared to other techniques. The polarized light microscope is designed to observe and photograph specimens that are visible primarily due to their optically anisotropic character.



Device: Optical microscope – Inverted & Polarized

Manufacturer: *LEITZ*

This lab is equipped with a polarized light optical microscope with the following specifications.

Technical specifications

- | | |
|--------------------------------|--------|
| Magnification | 50-500 |
| * Polarized light | |
| * Scanning large-sized samples | |



Device: **Microhardness testing**

Introduction

Microhardness measurements have long been used as a microprobe of the mechanical response of materials. Most of the microhardness measurements on irradiated material have been made with a Vickers indenter. The microhardness test involves the contact of a shaped indenter with the specimen surface under a fixed load. For the Vickers test the indenter is a diamond pyramid with a 136° included angle. After a defined application time (typically 30 s), the load is removed and the resulting indentation is measured.



Device: **Microhardness testing machine**

Manufacturer: *COOPA/MHI*

This lab is equipped with a microhardness testing machine with the following specifications.

Technical specifications

Load range

10 g – 1 kg

Device: **Camera**

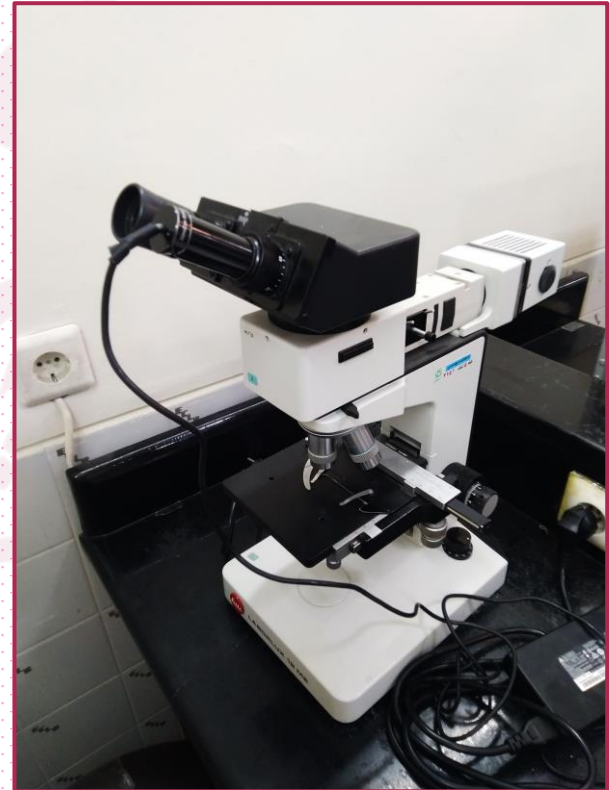
Manufacturer: *DINO*



After examination of the surface of a specimen, it comes many situations where it is necessary to take pictures from the surface. This lab is equipped with a camera which can replace the eyepiece to record the pictures from the surface of the specimen.

Technical specifications

- * Can be assembled on all of the available microscopes
- * The software of the camera provides the opportunity for measurement of the length, angle, and ...



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