Szkoła Doktorska Instytutu Niskich Temperatur i Badań Strukturalnych PAN
ul. Okólna 2, 50-422 Wrocław

Doctoral School of the Institute of Low Temperature and Structure Research, PAS
Okólna St. 2, 50-422 Wrocław, Poland

Laboratories at ILTSR available for PhD students of DS ILTSR PAS

in the summer semester 2025/2026 (May – June 2026)

Division of Optical Spectroscopy:

1. Laboratory of IR and Raman Spectroscopy
Contact: dr hab. Maciej Ptak (m.ptak@intibs.pl)
Group: 2-3 persons
Duration: 2 – 3 hours

Description:
During the practical training, PhD students will learn how to measure IR (transmission, reflectance, ATR) and Raman (also in polarized light) spectra of solid (monocrystalline, powder) and liquid samples. The basic theory and analysis of the obtained spectra using correlation methods and group theory will be discussed. PhD students are encouraged to bring their own samples and perform IR and Raman spectra on their own.

Registration of groups to internships starting in June 2026.

2. Laboratory of Optical Spectroscopy
Contact: dr Karol Lemański (k.lemanski@intibs.pl)
Group: max. 3 persons
Duration: 3 – 4 hours

Description:
Students will be able to participate in spectroscopic measurements, such as luminescence spectra, excitation, quantum yield, emission decay times. Under supervision, they will be able to assemble the optical system and operate the measuring equipment. When using a laser, it will be imperative to follow the health and safety rules.

3. Laboratory of Absorption Spectroscopy
Contact: dr Bogusław Macalik (b.macalik@intibs.pl)
Group: max. 2 persons
Duration: 2 – 3 hours

Description:

Practice will Students consist in measuring optical absorption spectra for transparent liquid or solid samples or diffusion scattering spectra for powder samples. You will be able to measure their research material.

Division of Structure Research:

1. Laboratory of Thermal Analysis (TG and DSC)
Contact: prof. Marek Drozd (m.drozd@intibs.pl)
Group: max. 4 persons
Duration: 2 hours

Description:
During the practice, participants will learn about selected methods of thermal analysis (differential scanning calorimetry (DSC) and thermogravimetry (TG)). Both methods will be used to quickly detect phase transformations occurring in molecular crystals in the temperature range of 100 – 300 K. The participants will prepare single-handed samples and carry out measurements of thermodynamic properties to determine the temperature and nature of phase transformations in selected molecular crystals.
The students who attempt this lab should have basic knowledge about thermodynamic rules and phase transition phenomena (first, second, and third thermodynamic laws and the theory of phase transitions (Ginsburg-Landau, Ehrenfest, phenomenological theory).

2. Laboratory of X-ray analysis (single crystals)
Contact: dr Dorota Kowalska (d.kowalska@intibs.pl)
Group: max. 4 persons
Duration: 2x2 – 3 hours

Description:
X-ray diffraction measurements will be carried out on monocrystalline samples using an Oxford Diffraction Xcalibur four-circle diffractometer with an Atlas CCD detector, equipped with an Oxford Cryosystems 1000 temperature attachment. Students will be able to select and prepare a sample for the study under a stereoscopic microscope, analyze the measurement results, solve and refine the crystal structure of the sample. The use of students' own single-crystalline samples is encouraged.

3. Laboratory of X-ray analysis (powders)
Contact: dr. Vasyl Kinzhybalo (v.kinzhybalo@intibs.pl)
Group: max. 4 persons
Duration: 2x3 hours
Description:
An introduction to powder X-ray diffraction. Students will be involved in the experiment and basic data processing including preparation of samples, operation of the XPertPRO powder diffractometer, phase analysis, unit cell refinement, Rietveld refinement and calculation of the crystallites' size. The use of students' own powder samples is encouraged.

Division of Nanomaterials Chemistry and Catalysis:

1. Laboratory of Transmission Electron Microscopy
Contact: Dr hab. Małgorzata Małecka (m.malecka@intibs.pl)
Group: max. 3 persons
Duration: 4 hours
Registration of max. 2 groups to internships starting in June 2026.

Description:
Demonstration of the preparation of samples for measurement.
Demonstration of the capabilities of the Philips CM-20 microscope (student's own samples may be observed after prior contact with the instructor).