



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

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

Special Recruitment to the Doctoral School of ILT&SR PAS in the Division of Biomedical Physicochemistry for PhD Student – Scholarship holder in the Research project NCN OPUS-28

Institution: Doctoral School of ILT&SR PAS,

Institute of Low Temperature and Structural Research, Polish Academy of Sciences

Position: PhD student – scholarship holder in the NCN research project (M/F)

Scientific discipline: **Physical Sciences, Chemical Sciences**

Date of announcement: **27.02.2026**

Application deadline: **23.03.2026**

Date of competition settlement: Recruitment results will be announced within 7 days after the end of the interviews.

Planned date of commencement of education and participation in the project: **01.05.2026**

Link to DS of ILT&SR PAS website: <https://phd.intibs.pl/en/>

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Keywords: luminescence, luminescence manometry

Doctoral School of Institute of Low Temperature and Structure Research of the Polish Academy of Sciences (DS of ILT&SR PAS) announces a **special recruitment** for a PhD student – scholarship holder (M/F) in the research project: **"High-sensitivity optical manometers based on luminescence kinetics"**, carried out on behalf of the National Science Center OPUS-28 (grant no. 2024/55/B/ST5/01411) in the Division of Biomedical Physicochemistry of the **Institute of Low Temperature and Structure Research of Polish Academy of Sciences in Wrocław.**

Recruitment is conducted in accordance with the Rules of Recruitment to the Doctoral School of ILT&SR PAS

https://phd.intibs.pl/files/dokumenty_EN/25-04-29-Zasady_rekrutacji_SD_INTiBS_PAN_en.pdf

Requirements for the candidate

The application should include a filled application form at the link <https://phd.intibs.pl/en/recruitment.html> and presented in Polish or English:

- **diplomas:** secondary school leaving certificate or upper secondary school leaving certificate; bachelor's (engineering) and master's degree, or a diploma of completion of integrated master's studies certifying the acquisition of a master's degree in chemistry, physics, materials engineering, or related fields. The original document of the diploma (paper version) must be submitted before taking the oath (this is a prerequisite for starting the program),
[in the case of candidates with exceptional academic achievements who do not meet this requirement: (1) a copy of the first-cycle degree or third-year of uniform master's degree diploma and (2) an application to the School Council for admission to the recruitment process, including a description of documented academic achievements of the highest quality],
Important: If you obtained your master's degree outside the European Union, you must additionally provide an apostille or authentication (legalization) of the originals of both your master's degree diploma and its supplement with grades by the diplomatic representation of the Republic of Poland (in the country where it was obtained). Documents submitted without the appropriate authentication will be considered as not meeting the formal requirements.
- **a duplicate** (certified copy) of the entire grade book/Transcript of Records of the first- and second-cycle program (or full-cycle Master's degree program), or a **supplement** to the degree with grades from the entire course of study, or **a student's (M/F) grading report from all years of their studies confirmed by the Dean's Office**, together with the calculated average grade from their studies;
- **a certificate of English-language skills at B2 level** or higher or information in the diploma supplement that the candidate completed an English course at the required level as part of the university program (if the supplement does not describe the level of the course, a certificate from the Dean's Office is required);
- **a cover letter** with an indication of the research topics within the framework of the research project;

- **additional documents** proving the candidate's suitability for scientific work (list of publications and conference presentations, list of completed courses and postgraduate studies, obtained language certificates, activity in scientific circles, etc.).

Doctoral Student Responsibilities

1. Implementation of the individual research plan in accordance with the approved research project.
2. Synthesis of inorganic materials doped with transition metal ions and/or lanthanide ions.
3. Characterization of the luminescent properties of the obtained phosphors as a function of applied temperature.
4. Analysis and interpretation of the obtained results.
5. Preparation of scientific reports and research publications.

Scholarship

The doctoral scholarship will be paid a maximum of 4 years in the monthly amount of:

- 5000 PLN (the amount will be reduced by the cost of mandatory social security contributions, etc., about 24%) until the month in which the doctoral student's mid-term evaluation at the doctoral school was conducted
- 6500 PLN (the amount will be reduced by the cost of mandatory social security contributions, etc., about 24%) after the month in which the student's mid-term evaluation at doctoral school was conducted with positive result.

The scholarship amount will not be lower than specified in the Law on Higher Education and Science and applicable executive regulations .

The scholarship will be paid after deduction of all components, in accordance with the applicable regulations and in accordance with the Act of 20 July 2018 Law on Higher Education and Science (Journal of Laws of 2024.10.24; 1571).

Joining the competition

Candidates wishing to enter the competition should submit all documents specified in the Rules of Recruitment to the Doctoral School of Institute of Low Temperature and Structure Research of the Polish Academy of Sciences.

https://phd.intibs.pl/files/dokumenty_EN/25-04-29-Zasady_rekrutacji_SD_INTiBS_PAN_en.pdf

Candidates' applications for admission to the School must be submitted by **23.03.2026**

a) by email to the address phd@intibs.pl (preferred method of application); however, the original documents should be delivered before the studies start (a failure to meet this requirement will result in the candidate's name being removed from the list of doctoral students),

b) in person at the School's Secretariat Office at the Institute of Low Temperature and Structure Research of the Polish Academy of Sciences, 2 Okólna St. in Wrocław, from 9 am to 3 pm

Description of the research project and the PhD thesis

The exceptional sensitivity of the spectroscopic properties of transition metal ions to changes in local point symmetry is reflected not only in shifts in the spectral position of their emission bands but also in modifications to their luminescence kinetics. For transition metal ions of a $3d^3$ electronic configuration (e.g., Cr^{3+} , Mn^{4+}), the application of isostatic pressure shortens the average metal-oxygen bond distance, resulting in an increase in crystal field strength. This compression raises the energy of the $4T_2$ level, thereby reducing the spin-orbit coupling between the $2E$ and $4T_2$ levels. Consequently, the luminescence kinetics of materials doped with Cr^{3+} and Mn^{4+} ions are prolonged under increased pressure. The sensitivity of luminescence kinetics in such materials to pressure changes can be significantly enhanced by employing a unique strategy of signal superposition from two luminescent ions. This innovative approach enables the development of luminescent manometers with unprecedented relative sensitivity, paving the way for highly precise pressure measurement applications. To achieve this, a specific group of phosphors will be synthesized, and their spectroscopic properties as a function of pressure will be investigated. The resulting data will be used to train a machine learning algorithm to predict the pressure-induced variation in the luminescent properties of

phosphors co-doped with Cr³⁺ and Mn⁴⁺ ions based on the structural data. This project will enhance our understanding of how the point symmetry of ions, host material stiffness, chemical composition, metal-oxygen bond length, and coordination number affect the manometric performance of the analyzed materials. Ultimately, it will enable the design of luminescent manometers with predicted manometric performance based on the structural parameters of the host material.

Additional information

For additional information, please contact the project manager prof. Lukasz Marciniak (e-mail: l.marciniak@intibs.pl, tel. +48 71 3954291).

Personal information

Candidates' personal data are collected and processed by the Institute of Low Temperature and Structure Research of Polish Academy of Sciences in Wrocław in accordance with the information on personal data processing available at <https://bip.intibs.pl/artykuly/rodo-1>