UNIVERSITY OF SILESIA
IN KATOWICE

Institute of Chemistry

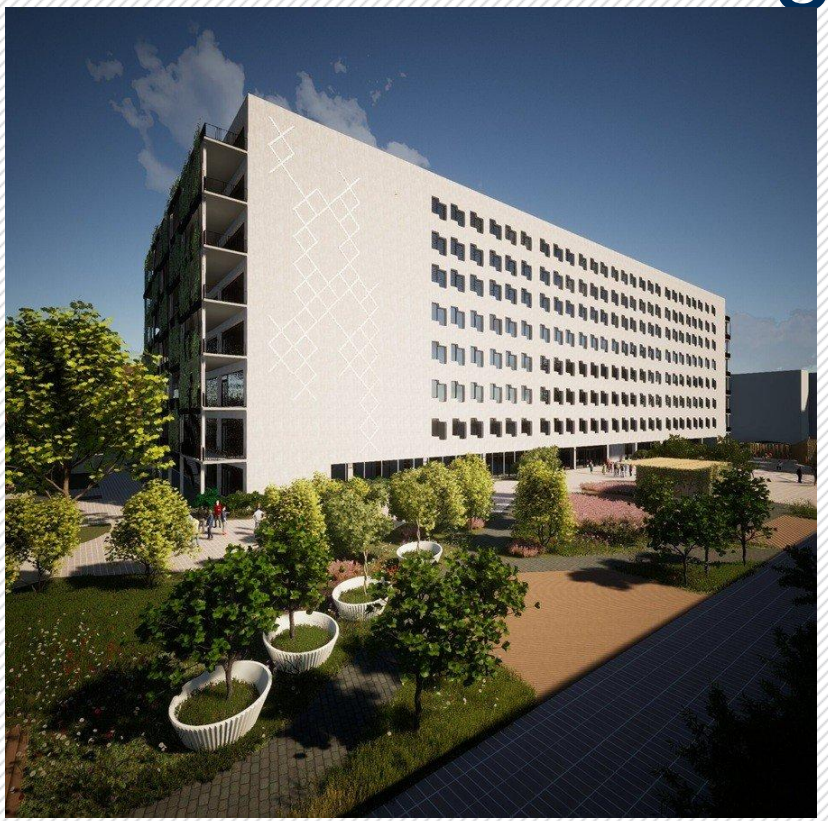
Faculty of Science and Technology

www.us.edu.pl/en

UNIVERSITY OF SILESIA
INSTITUTE OF CHEMISTRY

Currently in three locations

In a few years – new building!



In a few years – new building!

Currently under construction…

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Academic Staff

- Full professors:**11**
- Associate professors: **22**
- Assistant professors: **30**

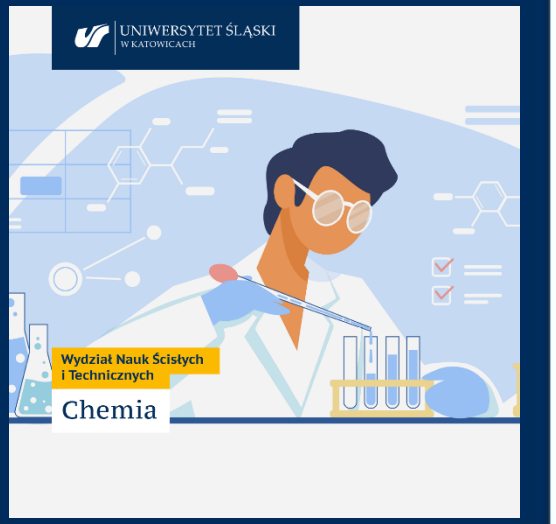
- Technical staff: **15**
- Administrative staff: **2**

- research teams: 14
- individual researchers: 9

We educate in the fields of:

- chemistry (bachelor, master)
- chemical technology (engineer)

PhD students: 18



Institute of Chemistry – research groups

- Thermodynamics in Action
- Modeling of Complex Instrumental Signals
- Bioorganics
- Drug Design and and Nanofamacology
- The Team of Physical Chemistry
- Research Group on Electron Correlation
- Electrosynthesis Group
- Forensic Chemistry Group
- The Team for Spectroscopy and Luminescent Materials
- Computational Chemistry Methods Application Team
- The Team of Polymers and Functional Materials
- The Team of Analytical Chemistry
- Group of Physicochemistry of Transition Metals Compounds
- Electron correlation research group

Main research topics

Drug design and synthesis

New molecular materials and nanomaterials

Materials for photonic and optophotonic applications

Graphene based nanomaterials and nanocomposites

High pressure studies of ionic liquids, fuels and biofuels

Theoretical chemistry

Analysis of air pollution (2.5 μm fraction) composition in accordance with the EPA protocol

Our research equipment

- X-ray lab: X-ray diffractometer Gemini A Ultra, Oxford Diffraction (temp: 90 to 490K)
- Spectroscopy lab: spectrophotometers FLS-980 and Hitachi F-7000, UV-VIS-NIR Nicolet is50, spectrometer FT-IR Nicolet iS5;
- Ultrafast laser spectroscopy lab: femtosecond spectrofluorimeter for transient absorption and light impulse in the UV-VIS-NIR range in the pump-probe system;
- High pressure lab: unique speed of sound meter for high pressures (up to 1000 atm.), transitiometer, and high pressure vibrating tube densimeter.
- IR and Raman lab: FT-IR and Raman spectrometers, spectrofluorimeter coupled to the tunable optical parametric oscillator (UV/VIS/NIR range)

Our research equipment

HPTLC lab: set of CAMAG accessories to optimize the composition of the mobile phase, carry out the separation process, qualitative and quantitative determination.

PM 2.5 composition testing lab: chromatographic, XRF and thermal-optical analysis of the composition of fractions and components

Organic chemistry lab: Bruker Ascend 500 NMR spectrometer, EPR, IR, UV/VIS, DSC and TGA analysers, GC/MS spectrometers and HPLC/MS.

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Collaboration with industry

Regeneration of deNOx catalysts

Patents - PL237032; CZK309106; SK288935.

Partners: PGE Pomorzany, Energopomiar Gliwice, ENEA Kozienice, Veolia Łódź, QEMETICA SODA POLSKA S.A.Janikowo, CIECH Soda S.A. Inowrocław, Enea Ciepło Białystok, ENERGA Ostrołęka

In 2022 – 2025 four industrial regenerations were performed (value of ca. € 430 000)

AdiPlus – dioxolane adjuvant

- Increases wettability
- Reduces the neccessary amount of fertilizers (from 20 to 50%) used on corn and barley
- Reduces the amount of herbicides (from 16 to 40%. Tested on RoundUp 360 plus)
- Increase in crop yield from up to 24%

AdiPlus – Audience choice award winner!

ING

Grant Programme for startups and scientists

https://www.ing.pl/o-banku/esg/program-grantowy-edycja-6

„For a substance that improves the absorption of herbicides and fertilizers by plants, helping to reduce the use of chemicals in agriculture”

Current research projects

PRELUDIUM 21

MEDUSA - thermodynamic anomalies in liquids using computer simulations	**€ 49 748,34**
Modified fullerenes in the adsorption and ultratrace determination of metal ions	**€ 49 745,26**

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Current research projects

SONATA

Bipolar materials based on fused pyrrolo- and indolo[3,2,1-jk]carbazole rings for optoelectronic applications **€ 128 682,46**

Understanding the Conductive Properties of Nanofluids in Nanopores for Next Generation Triboelectric Nanogenerators **€ 278 055,92**

Scalable and nanotechnology-enhanced composites for thermal energy storage with unprecedented efficiency **€ 333 09,24**

Innovative Strategies for Efficient Electricity Harvesting and Charge Generation for Durable and Flexible Triboelectric Nanogenerators **€ 335 066,35**

Ir(III), Re(I) Compounds and Heterobimetallic Ir(III)–Re(I) Systems as Effective Emitters and Photosensitizers **€ 234 893,36**

Next-Generation Fluoroquinolone Ionic Liquids: Effective Antibiofilm Agents **€ 310 492,89**

Current research projects

OPUS

IoCarboNanoFluids (ICON Fluids) as a new class of designable multi-ionic systems functionalized with carbon nanotubes - a comprehensive understanding of intermolecular interactions and molecular architecture €609 421,56; opus 21st

Thermodynamic modeling combined with new measurement techniques of the physicochemistry of liquid-liquid equilibrium in a wide pressure range of systems based on ionic liquids €850 094,08 opus 28th

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Publishing

- 2023: 154
- 2024: 177
- 2025: 180

Patents (2022-2024): 66

In 2023 20 papers published in journals with IF ≥ 8,0

Stanford's top 2% rating (2025): 21 researchers from University of Silesia, 13 of them are from the Institute of Chemistry

TOP 2% SCIENTISTS
LEADING MINDS IN SCIENCE

Teaching

	2021/22	2022/23	2023/24	2024/25
Chemistry (degree I & II)	229	180	113	114
Chemical technology	55	38	27	25

620

Teaching

- 1st step: Bachelor/Engineer
- 2nd step:
  Master's + specializations

- Analitical chemistry
- Biomedical chemistry
- Forensic chemistry
- Physicochemistry of condensed matter
- New materials for technology
- Synthesis of (in)organic compounds
- Teoretical methods in chem.

Teaching

- 1st step: Engineer (3.5 year) Chemical Technology

  + specializations

- Green chemistry and clean technologies
- Organic and inorganic technology

- 2nd New specialization:

Food Chemistry

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PhD study in University of Silesia

Doctoral system – current framework

- Doctoral education in Poland within **Doctoral Schools** (since 2019)
- PhD programmes are **structured, interdisciplinary**, and last **4 years**
- Doctoral candidates follow an **individual research** plan combined with a formal **training programme**
- Progress is evaluated through a **mid-term evaluation**, aligned with European standards

Funding model

- PhD candidates receive a **monthly doctoral scholarship** (no tuition fees)
- The scholarship level increases after a successful mid-term evaluation
- Additional funding opportunities include:
  - national research grants (e.g. **NCN**),
  - institutional projects

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European
City of Science
Katowice 2024

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