**NON-PROFIT JOINT STOCK COMPANY**
**« KAZAKH NATIONAL RESEARCH TECHNICAL UNIVERSITY**
**NAMED AFTER K.I.SATBAYEV"**

СӘТБАЕВ УНИВЕРСИТЕТІ

SATBAYEV UNIVERSITY

**APPROVED by**
**Director of MMI**
**Rysbekov K.B.**
**Protocol No. 10 dated June 21, 2023**

# Annual report

# Departments of Chemical Processes and Industrial Ecology

**for the 2022 - 2023 academic year**

**Almaty 2023**

## 1. General characteristics of the department

**1.1** The Department of "Chemical Processes and Industrial Ecology" (hereinafter referred to as CP&IE) at the NJSC "Kazakh National Research Technical University named after K.I. Satbayev" conducts activities by basic educational programs of higher and postgraduate education, carries out training of scientific and pedagogical personnel, research, international, educational and methodological and other types of activities.

## 2 Contingent

**2.1.** The contingent of students in the Department of "Chemical Processes and Industrial Ecology" for the academic year 2022-2023 totals 144 individuals, comprising 122 undergraduate students, 10 master's students, and 12 doctoral candidates. The department is currently concluding training in the following educational programs: EP “6B05205 Chemical and Biochemical Engineering” (51 students) and “6B07110 Chemical and Biochemical Engineering” (3 students), a total 54 students.

### Table 1. Contingent of students

| No. | EP | Fact | | | Plan 2023-2024 | | |
|---|---|---|---|---|---|---|---|
| | | Total | grant | on a paid basis | Total | grant | on a paid basis |
| Bachelor's degree | | | | | | | |
| 1 | 6B05206 – Engineering ecology | **61** (2 IDO) | 54 | 7 | **65** | 60 | 5 |
| 2 | 6B07116 – Technology of main production and new materials | **7** ( 1 IDO) | 5 | 2 | **12** | 10 | 2 |
| 3 | 6B07217 – Technology of rare and radioactive elements | - | - | - | **10** | 8 | 2 |
| Master's degree | | | | | | | |
| 1 | 7M05202 **–** Bioecological engineering | - | - | - | **5** | 5 | |
| 2 | 7M07110 **–** Chemical processes and production of chemical materials | **9** | 8 | 1 | **5** | 5 | |
| 3 | 7M07143 **–** Chemical technology of inorganic substances | **1** | 1 | - | **5** | 5 | |
| Doctoral studies | | | | | | | |
| 1 | 8D05201 Bioecological engineering | **5** | 5 | - | **5** | 5 | |
| 2 | 8D07109 Innovative technologies and new inorganic materials | **7** | 7 | - | **5** | 5 | - |

## 2.2. Student achievements

To implement the Development Program of the institute and the department for 2022-2026, students are encouraged to participate in Olympiads, competitions, and contests at various levels. This initiative aims to identify talented students across diverse fields of science and sports, thereby fostering cognitive and practical activities as well as nurturing creative potential.

During the fall semester of the 2022-2023 academic year a fourth-year student's Maria Tsai, enrolled in the EP "6B05205 Chemical and Biochemical Engineering," represented the “Zhylany” team and successfully advanced to the finals of the International KVN League held in Minsk.


*Team "Zhylany"*

4-th year student of the EP “6B05205 Chemical and Biochemical Engineering” Aisanova Asylzhan became the winner of the “Best Student 2022” competition.

"Best Student 2022"

1-st year students of EP “6B05206 Engineering Ecology" Rakhimova Aruzhan took 2-nd place in the competition "Zhaina Zhastyk", Tokanova Aruzhan took part for the SU team in the volleyball competition among girls and took 1-st place.

*Winners of Republican Olympiads and Research Competitions:*

- Ikhsan N.A., Galymova N.T., and Smagulova S.A., EP “6B07116 Technology of basic production and new materials”, First-degree Diploma from the Ministry (Contest of Student Research Paper on base of the Karaganda University named after E.A. Buketov);
- Timurova Lyayla, EP “6B05205 Chemical and biochemical engineering”, Second place at the International competition of student scientific works "Black Sea Sciens 2023" in Odessa;
- Utegenova Aruzhan, EP “6B05205 Chemical and biochemical engineering” (Ecology), Third place at the International competition of student scientific works "Black Sea Sciens 2023" in Odessa;
- Petrash Diana, EP “6B05205 Chemical and biochemical engineering” (Ecology), Third place at the XV Republican Subject Olympiad among students (Kazakh National University named after Al-Farabi);
- Tolegen Sabyrzhan, Utegenova Aruzhan, Petrash Diana, EP “6B07110, 6B05205 Chemical and biochemical engineering” (ChTIS, Ecology) Second place at

the XV Republican Subject Olympiad among students (Kazakh National University named after Al-Farabi);

- Tolepbaeva Diana, Khamitova Venera, Tolepbergenova Madina, EP “6B05205 Chemical and biochemical engineering” (Ecology), Second-degree Diploma at the International Student Online Olympiad, ENU named after L.N. Gumilyov;

- Fanina Anastasia, Utegenova Aruzhan, EP “6B05205 Chemical and biochemical engineering” (Ecology), Second-degree Diploma at the National University named after S.M. Beketov in Ukraine;

- Timurova Lyayla, EP “6B05205 Chemical and biochemical engineering” (Ecology), Third place at the International competition of student scientific works in specialty 101 Ecology, Kremenchuk, June 1-3, 2023.

### 2.3. Qualitative composition of teaching staff

The Department of CP&IE comprises 21 teachers, among of them 20 employed on a full-time basis. There are 4 Doctors of Science, 8 Candidates of Science, and 1 PhD. The department's degree attainment rate stands at 66.7% for the spring semester of the 2022-2023 academic year.

**Table 2. Quantitative and qualitative composition of professors teaching staff**

| Name departments | Total teaching staff/ from them staff | Admitted to the university on a contract basis | | The doctors sciences, professors/ from them staff | Candidates sciences, associate professors/ from them staff | % With scientist degrees And ranks/ from them state. | Doctor PhD | Combine whether | | Hourly workers | Members national Academy sciences | teaching staff With basic education | Staffing teaching staff By state. disp. V % | Experience scientific pedagogicall y Ouch work | | | Average age teaching staff | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | With scientists degrees And ranks | | | | | Total | With scientists degrees And ranks | | | | | Before 5 years | 5-15 years | Over 15 years | Before 35 years | 35-50 years | Over 50 years/ from them pension |
| CP&IE | 20/20 | 20 | 13 | 4/4 | 8/8 | 65/65 | 1 | 1 | - | 3 | - | 100 | 100 | - | 6 | 15 | 2 | 7 | **12** |

### 2.4. Main achievements of the teaching staff

The primary target in the development of human capital of the institute and the department is to reduce the average age while and high standard of teaching proficiency.

As per the decision of the Republican Commission for Personnel Training Abroad on December 24, 2021, Professor Yelikbaev B.K. from the Department of CP&IE was awarded the prestigious international scholarship "Bolashak." Between May 2, 2022, and September 30, 2022, Professor Yelikbaev B.K. successfully completed a scientific internship at Ohio State University (USA).

CFAES

*Certificate of Achievement*

THIS CERTIFICATE IS PRESENTED TO

**Bakhytzhan Yelikbayev**

Professor in the Department of Chemical Processes and Industrial Ecology, Satpayev University, Almaty, Kazakhstan

has successfully completed a five-month visiting fellowship to pursue research on climate-smart agriculture, soil health, carbon sequestration, and heavy metals pollution at The Ohio State University South Centers under the mentorship of Dr. Rafiq Islam in the Soil, Water, and Bioenergy Resources program.

**Presented by The Ohio State University South Centers**
Piketon, Ohio, USA

Awarded on this thirtieth day of September, in the year Two thousand and twenty-two.

Thomas Worley, Ph.D.
Director

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL AND ENVIRONMENTAL SCIENCES

Rafiq Islam, Ph.D.
Program Director
Soil, Water, and Bioenergy Resources

In 2022, Dr. Ainaz Kairatovna Abildina, an associate professor at the Department of CP&IE, was honored as the Best University Teacher of the Year following her exceptional performance in the "Best University Teacher - 2022" competition.

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҒЫЛЫМ ЖӘНЕ ЖОҒАРЫ БІЛІМ
МИНИСТРЛІГІ

МИНИСТЕРСТВО НАУКИ И
ВЫСШЕГО ОБРАЗОВАНИЯ
РЕСПУБЛИКИ КАЗАХСТАН

**КУӘЛІК**

**Абильдина**
**Айназ Кайратовна**

2022 жылғы
«Жоғары оқу орнының үздік
оқытушысы» атағының иегері болып
табылады

**СВИДЕТЕЛЬСТВО**

**Абильдина**
**Айназ Кайратовна**

является обладателем звания
«Лучший преподаватель вуза» 2022
года

Министр С. Нұрбек

Астана, 2023

By the decision of the Council of Rectors and the Academic Council of KazNRTU named after K.I. Satbayev, Professor Abdiev K.Zh. (Certificate No. 00185 on October 21, 2022), Associate Professor Kubekova Sh.N. (Certificate No. 0086) were honored for special contributions to the advancement of science and higher education. Additionally, Professor Abdiev K.Zh. (Certificate No. 036) and Associate Professor Mukhamedova R.F. (Certificate No. 010) were presented with the Gold Medal of KazNRTU.

In December 2022 year professors Kapralova V.I. and Abdiev K.Zh. were awarded "Kurmet diplomas" by the Minister of Science and Higher Education Mr.S. Nurbek.



Professor Kapralova V.I. and Associate Professor Kubekova Sh.N. were honored by the Ministry of Industry and Infrastructure Development (MIID) with the badge "Enbek Danky" of the 3-rd degree.



## 3. Educational programs offered at the Department

### Table 3 - List of educational programs

| No. | Code and name of the educational program group | Code and name of the educational program | Agency (accreditation) |
|---|---|---|---|
| **B bachelor's degree** | | | |
| 1 | B051 – Environment | 6B05206 – Engineering ecology | NAAR AB 4376/1 06/10/2022-06/09/2027 |
| 2 | B060 – Chemical Engineering and Processes | 6B07116 – Technology of main production and new materials | **No** |
| 3 | B071 – Mining and mineral extraction | 6B07217 – Technology of rare and radioactive elements | **No** |
| **Master's degree** | | | |
| 1 | M 087 – Environmental Technology | 7M05202 – Bioecological engineering | IAAR AB 3607 06/11/2021-06/10/2026 |
| 2 | M097 – Chemical Engineering and Processes | 7M07110 – Chemical processes and production of chemical materials<br>7M07143 – Chemical technology of inorganic substances | NAOKO SA-A No. 0203/1 12/28/2020 - 12/27/2025 |
| **Doctoral studies** | | | |
| 1 | D087 – Environmental protection technology | 8D05201 Bioecological engineering | IAAR AB 3608 06/11/2021-06/10/2026 |
| 2 | D097 – Chemical Engineering and Processes | 8 D 07109 Innovative technologies and new inorganic materials | NAAR AB 4396 06/10/2022-06/09/2027 |

## 4. Double degree programs

One of the priority areas for the integration of Kazakhstani higher education into the international educational space is certainly double-diploma education.

**Table 4. List of joint double-diploma educational programs with foreign universities**

| No. | Code and name of EP | Partner university | Contingent of students according to DD |
|---|---|---|---|
| 1 | 7M07110 Chemical processes and production of chemical materials | Tomsk Polytechnic University | 09/01/2023 |

## 5. Introduction of elements of dual training

According to the instructions voiced by the Minister of Education and Science on May 20, 2021 regarding the implementation of dual education, in the spring semester of the 2022-2023 academic year, the Department of Chemical Processes and Industrial Ecology, as part of dual education, sent graduate students to undergo practical classes at “KazPhosphat” LLP, LLP "INCREASE - FOOD (Shinline)".

**Table 5. Dual training EP of the Department CP&IE**

| No. | Name enterprises | Agreement (agreement number, date) | Note |
|---|---|---|---|
| 1 | Shin-Line Company | Memorandum No. 08-118IR dated 08/31/2021. | 20 students from 13.03-17.03.2023 |
| 2 | Kazphosphate LLP | Agreement No. 686/4577/21-IR dated November 1, 2021 | 2 students from 27.03-08.04.2023 |

## 6. Scientific and innovative activity

### 6.1 Results of research works

The organization of scientific work at the institute and the department is carried out in accordance with the Regulations on research, development and technological work within the framework of the formation and implementation of scientific, research, technical and innovative projects and programs.

Teachers of the Department of CP&IE actively take part in the competition of the Ministry of Education and Science for grant funding for scientific and technical projects for 2022-2024, conduct commercial contract projects, and also take part in commercialization projects. The table provides information about the department's scientific projects.

## Table 6.1. Scientific projects of the Department of CP&IE for the reporting period

| No. | Full name of the head | Project topic | IRN | Amount of funding | Source of financing | Members project |
|---|---|---|---|---|---|---|
| 1 | Zhursimbaeva Mariyamkul Bu rkankyzy | Zhana polymerlic biocide kosylystar: synthedeu zhene Kasietterin zertteu | AR14870286 | 74 326, 945 mn tenge | Grant funding for scientific and (or) technical projects for **2022-2024** MES RK | Abdiev K.Zh., Seytkalieva N.Zh., Kusainova G.K., Bagadilov E.K., Orynbaev B.E., Mohamad Nasir Bin Mohamad Ibrahim , Baybosynova K. |
| 2 | Abildina Ainaz Kairatovna | Study of the mechanism of intercalation processes at the anode of magnesium-ion batteries | AR15473167 | 19,000,000 tenge | Grant funding for young scientists under the project “Zhas Galym ” for **2022-2024** | - |
| 3 | Dalbanbay Amantay | Diatomic catalyst for electrochemical production of hydrogen peroxide | AR15473238 | 18,950,000 tenge | Grant funding for young scientists under the project “Zhas Galym ” for **2022-2024** | - |
| 4 | T ursynbolat Satar, Dalbanbay Amantay | Development of electrochemical technology for producing hydrogen peroxide | AR14872241 | 34,000,000 tenge | Grant funding for scientific and (or) technical projects for **2022-2024 .** | Dauletbay A., Dalbanbay A., Asylkhan A., Dalbanbay Aybota. |

## Table 6.2. Economic contractual topics

| No. | Full name of the head | Project topic | Amount of funding | Source of financing | Members project |
|---|---|---|---|---|---|
| 1 | Kapralova V.I. | Development of a method for conditioning phosphogypsum to obtain gypsum binders 04.07.2023 r. no 09/30/2023 | 2 million tenge | DELMA LLP 2022-2023 | Raimbekova A.S. Kubekova Sh.N. |
| 2 | Kezembayeva G.B. | Reducing methane emissions from agriculture » | 2 million tenge | 2022-2023 | Nurmakova S.M. Kubekova Sh.N. |

## Table 6.3. Publication activity and patents

| Department of CP&IE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **No.** | **Academic years** | **articles in foreign publications** | | | | **conference tions** | **paten You** | **mono graphies** | **Other articles** |
| | | Q 1 | Q 2 | Q 3 | Q 4 | | | | |
| 1 | **2021-2022** | 2 | 3 | 3 | 1 | 25 | 1 | | 7 |
| 2 | **2022-2023** | 5 | 8 | 5 | | 9 | 2 | | 3 |
| 3 | **2023-2024** | 5 | 8 | 5 | 2 | 4 | | **1** | 5 |
| | **Total :** | **12** | **19** | **13** | **3** | **38** | **3** | | **15** |

## Table 6.4. List of publications of teaching staff of the Department of CP&IE for 2021, 2022, 2023

| No. | Name | Nature of the publication | Output data | Number of pages | Co-authors |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| | **Publications in international peer-reviewed scientific journals included in the Scopus/Web of Science database** | | | | |
| 1 | Structure-Activity Relationship of Local Anesthetics Based on Alkynylpiperidine Derivatives | electronic | Pharmaceutical Chemistry Journal, 2021, 54(12), P. 1209–1214. DOI 10.1007/s11094-021-02345-9. | | Zhumakova, S.S., Malmakova, A.E., Yu, V.K., Praliyev R.D, **Iskakova T.K.,** Satpaeva, E.M., Seilkhanov, T.M. |
| 2 | P(DADMAAC-co-DMAA): Synthesis, thermal stability, and kinetics. | electronic | Polymers for Advanced Technologies. July 2021. V. 32. Issue 7. P. 2669-2675. (**Q1**, SJR 0.61, IF 2.7, Percentile 75%, Citations 6) https://doi.org/10.1002/pat.4999 | | Akhmetzhan Ayatzhan, Ayezkhan Tashenov, Abeu Nurgeldi, Ospanova Zhanar, **Abdiyev Kaldibek**, Toktarbay Zhexenbek, Nuxat Nuraje |
| 3 | Optimization of the oxidative cracking of fuel oil on catalysts obtained from Kazakhstan raw materials | electronic | RJC. - Vol. 14, No. 2. – P.1065 – 1071, April – June. – 2021. http://rasayanjournal.co.in/admin/php/upload/3168_pdf.pdf **Q3**, SJR 2020 0,28, CiteScore2020 2,1. 45$^{th}$ percentile **DOI:** http://dx.doi.org/10.31788/RJC.2021.1426152 | | Kubekova Sh and e.t.c |

| | | | | | |
|---|---|---|---|---|---|
| 4 | Hydrogenation of aromatic nitro compounds to amines on nickel and iron-containing catalysts | electronic | Rasayan J. Chem., 14(2), 1223-1229(2021) http://rasayanjournal.co.in/admin/php/upload/3190_pdf.pdf **Q3**, SJR 2020 0,28, CiteScore2020 2,1. 45th percentile **DOI:** http://dx.doi.org/10.31788/RJC.2021.1426124 | | Kubekova Sh and e.t.c |
| 5 | P(DADMAAC-co-DMAA): Synthesis, thermal stability, and kinetics. | electronic | Polymers for Advanced Technologies. July 2021. V. 32. Issue 7. P. 2669-2675. (**Q1**, SJR 0.61, IF 2.7, Percentile 75%, Citations 6) https://doi.org/10.1002/pat.4999 | | Akhmetzhan Ayatzhan, Ayezkhan Tashenov, Abeu Nurgeldi, Ospanova Zhanar, **Abdiyev Kaldibek**, Toktarbay Zhexenbek, Nuxat Nuraje |
| 6 | Optimization of the oxidative cracking of fuel oil on catalysts obtained from Kazakhstan raw materials | electronic | RJC. - Vol. 14, No. 2. – P.1065 – 1071, April – June. – 2021. http://rasayanjournal.co.in/admin/php/upload/3168_pdf.pdf **Q3**, SJR 2020 0,28, CiteScore2020 2,1. 45th percentile **DOI:** http://dx.doi.org/10.31788/RJC.2021.1426152 | | Kubekova Sh and e.t.c |
| 7 | Hydrogenation of aromatic nitro compounds to amines on nickel and iron-containing catalysts | electronic | Rasayan J. Chem., 14(2), 1223-1229(2021) http://rasayanjournal.co.in/admin/php/upload/3190_pdf.pdf **Q3**, SJR 2020 0,28, CiteScore2020 2,1. 45th percentile **DOI:** http://dx.doi.org/10.31788/RJC.2021.1426124 | | Kubekova Sh and e.t.c |
| 8 | 2-acrylamido-2-methylpropane sulfonic acid/allylamine polyampholytic copoly-mers: synthesis and flocculating properties | electronic | Polymer Bulletin. 2021. (IF 3,0; Q 2). | | K.Zh. Abdiyev, Milan Maric, B.Ye. Orynbayev, Zh. Toktarbay, M.B. Zhursumbaeva, and N.Zh. Seitkaliyeva |

| | | | | | |
|---|---|---|---|---|---|
| 9 | Characterization and swelling properties of copolymer Poly(N, N-dimethyl acrylamide -co-acrylic acid) and homopolymer Poly (acrylic acid). | electronic | Egyptian Journal of Chemistry. 2022. Vol. 65, Issue 4. P. 767-773. (**Q3**, CiteScore 1.4, SJR 0.248, Percentile 35%, IF 1.53, Citations 0) https://doi.org/10.21608/EJCHEM.2021.95005.4465 | | Ulantay Nakan, Balgyn Tolkyn, , Tulegen Seilkhanov, Bibigul Kenzhebayeva, K.Zh . Abdiyev.and…. |
| 10 | Obtaining and Modification of Interpenetrating Networks Based on Natural Polymers and Acrylic Acid Derivatives | electronic | Chem.Chem.Tech.- 2022.- V. 65, Iss. 3.- P. 83–90 | 8 | Iskakova T.K., Kussainova G.K. Zhunusbekova N.M. Chinibaeva N.S. Khudaibergenov N.S. |
| 11 | Mechanically activated silicon-phosphorus fertilisers based on the natural and anthropogenic raw materials of Kazakhstan (статья) | electronic | Journal of Physics and Chemistry of Solids, 2022, 162, 110518 (**Q1**) | | Kubekova, S.N. Kapralova, V.I. Ibraimova, G.T. Raimbekova, A.S. Ydyrysheva, S.K. |
| 12 | The study of manganese phosphate materials based on enrichment wastes (статья) | electronic | Journal of Chemical Technology and Metallurgy, 57,1, 2022,176-183 (**Q3**) | 7 | V.I.Kapralova, A.K.Popova, Sh.N. Kubekova |
| 13 | Structure formation in suspensions and biocidal properties of copolymer of 2-acryl-amido-2-methylpropanesulfonic acid and allylamine. («Статья») | electronic | Materials Today: Proceedings. V. 71. Part 1. 2022. P. 13-17. IF 1.46, **Q3**, Percentile 42 % . ISSN: 2214-7853 https://doi.org/10.1016/j.matpr.2022.06.050 | 5 | K.Zh. Abdiyev, Zh. Toktarbay, B.Ye. Orynbayev, M.B. Zhursumbaeva, N.Seitkaliyeva U. Nakan. |

| | | | | | |
|---|---|---|---|---|---|
| 14 | Novel 7-Aryliden-3,3a,4,5,6,7-(hexahydro-5-(2-ethoxyethyl)-2-phenyl-3-aryl-2H-pyrazolo[4,3-c]pyridine Hydrochloride: Synthesis and Structure | electronic | Eurasian Chemico-Technological Journal. – 2022.- V. 24, Iss. 1. - P. 43–50, **Q3** | 8. | Iskakova T.K., Koshetova Z.A. Yu V.K. Seilkhanov T.M. Berlin K.D. |
| 15 | Flocculating properties of 2-acrylamido-2-methyl -1-propane sulf onic acid- co-allylamine polyampholytic copolymers («Статья») | electronic | Polymer bulletin. Vol.79. 2022. 10741–10756. Issue 1. IF 3.2.Квартиль **Q2**. Percentile 69%. ISSN 1436-2449 https://doi.org/10.1007/s00289-021-03994-2 | 15 | K. Zh. Abdiyev, Milan Maric, B. Ye. Orynbayev, Zh. Toktarbay, M. B. Zhursumbaeva N.Zh.Seitkaliyeva |
| 16 | Kinetic Analysis of Methane Hydrate Formation with Butterfly Turbine Impellers | electronic | Molecules 2022, 27, 4388. https://doi.org/10.3390/molecules27144388 IF 4.6 Квартиль **Q2** Cite Score 6.7, percentile 78% | | Sotirios Nik. Longinos, Dionisia Dimitra Longinou, Nurbala Myrzakhmetova, Nazgul Akimbayeva, Mariamkul Zhursumbaeva, 14Kaldibek Abdiyev , Zhexenbek Toktarbay and Mahmut Parlaktuna |
| 17 | Novel 7-aryliden-3,3a,4,5,6,7-(hexahydro-5-(2-ethoxyethyl)-2-phenyl-3-aryl-2h-pyrazolo[4,3-c]pyridine hydrochloride: synthesis and structure | electronic | Eurasian Chemico-Technological Journal. 2022. Т. 24. № 1. С. 43-50. doi.org/10.18321/ectj1147.**Q3** | | Koshetova Z.A., Yu V.K., **Iskakova T.K.**, Zhumanova N.A., Beketov K.M., Malmakova A.E., Praliyev K.D., Seilkhanov T.M., Berlin K.D |

| | | | | | |
|---|---|---|---|---|---|
| 18 | Novel Cationic Polymer Surfactant for Regulation of the Rheological and Biocidal Proper-ties of the Water-Based Drilling Muds. («Статья») | electronic | *Polymers* , V.*15. Issue* 2, 2023.P. 330; Open access. Q1, SJR 0.73, IS 4.80. IF 5.0 . Percentile 74%. **ISSN: 2073-4360** https://doi.org/10.3390/polym15020330 | 20 | **Abdiyev, K.Zh**., Maric, M., Orynbayev, B., Zhursumbaeva, M., **N.Zh.Seitkaliyeva** Toktarbay, Z. |
| 19 | Review of Slow Sand Filtration for RawWater Treatment with Potential Application in Less-Developed Countries Обзор | electronic | Water **2023**, 15, 2007. https://doi.org/10.3390/w15112007 IF= 3,4, **Q1**, percentile -85% **ISSN** 20734441 | 22 | **Abdiyev K.** Azat S. Kuldeyev E. Ybyraiymkul D. **Kabdrakhmanova S.** |
| 20 | Sustainable Restoration of Degraded Landscapes Improves Soil Glomalin Content. Research Square 2023. | | Research Square , September, 2023. **Scopus Q2** https://doi.org/10.21203/rs.3.rs-3104612/v1 | 11 | **Bakhytzhan Yelikbayev**, Eduardo Correa, Neimar Duarte, Marcela Pagano |
| 21 | Alfalfa–organic amendments impact soil carbon sequestration and its lability in reclaimed loess. | | Land Degradation & Development,1–14. (2023). Scopus **Q1** 11 September 2023 **https://doi.org/10.1002/ldr.4899** | 14 | **Yelikbayev, B. K.,** Pagano, M. C., Mamedov, A. I., & Islam, K. R. |
| 22 | The Diversity of Arbuscular Mycorrhizal Fungi and Their Associations in South America: A Case Study of Argentinean and Brazilian Cattle Raising Productive Ecosystems: A Review. | electronic | *Diversity* **2023**, *15*(9), 1006; **https://doi.org/10.3390/d15091006** Scopus Q2 | 32 | Lugo, M.A.; Ontivero, R.E.; Iriarte, H.J.; **Yelikbayev, B.;** Pagano, M.C. |
| 23 | Investigation of the Prospects for the Use of Iron-Containing Nanocomposites Doped with Rare Earth Elements as Catalysts for the Purification of Aqueous Media | electronic | *Magnetochemistry* **2023**, *9*(3), 87; **https://doi.org/10.3390/magnetochemistry9030087** Q2 | 24 | Kubekova Sh., Kadyrzhanov, K.K., Kozlovskiy, A.L., Egizbek, K.B., Kenzhina, I.E., Zdorovets, M.V. |

| | | | | | |
|---|---|---|---|---|---|
| 24 | Corrosion behavior of magnesium in aqueous sulfate-containing electrolytes (Статья) | electronic | Journal of Magnesium and Alloys. V 11, I 6, P 2125 – 2141. 2023, ISSN 2213-9567,<br>Materials Science – 97% percentile<br>JCR IF= 17.6, **Q1** | | Andrey P. Kurbatov, Yeldana G. **Abildina A,** Bakhytzhan, Raigul Zh. Jumanova, Akmaral M. Argimbayeva, Khaisa Avchukir, Gulmira S. Rakhymbay |
| 25 | Nanostructured $TiO_2$ as anode material for magnesium-ion batteries (Статья) | electronic | Journal of solid state electrochemistry. 2023, 27(1), с 223-233, ISSN 1432 – 8488,<br>Materials Science – 63% percentile JCR IF= 2.5, **Q4** | 10 | A.M. Argimbayeva, A.P. Kurbatov, Y. Bakhytzhan, G.Rakhymbay, **Abildina A,** R. Zh. Dzhumanova, Kh. Avchukir |
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| 72 | Эколого-экономическое обоснование дегазации метана угольных пластов. | electronic | Сәтбаев Оқулары-2023» атты халықаралық конференциясы. | | Кухарева А., Петраш Д., **Кезембаева Г.Б.**, Нурмакова С.М., Сарсенбаев С.О. |
| 73 | Создание автоматизированной системы контроля качества вод в РК. | electronic | Халықаралық ғылыми-тәжірбиелік «Ұлытау – Қазақстан металлургиясының бесігі» атты конференция. | | **Кезембаева Г.Б.,Нурмакова С.М**.,Дюсенова Ж.А., Абдрахманова Ж.Б., Горбовских М.А. |
| 74 | Рекультивация нефтезагрязненных земель на примере месторождения Каражанбас. | electronic | Сәтбаев Оқулары-2023» атты халықаралық конференциясы | | М.Д. Алдакова, С.М. **Нурмакова,** Б.Х. Тусупова, Ж.Б. Абдрахманова. **Кезембаева Г.Б.** |
| 75 | Антикоррозионные конверсионные покрытия на основе техногенного сырья Казахстана | printed | Сборник материалов Международной научно-технической конференции. "Актуальные проблемы создания и использования высоких технологий переработки минерально-сырьевых ресурсов Узбекистана". Ташкент 6-17 ноября 2023. стр 302-303 | | **Капралова В.И., Кубекова Ш.Н.** |
| 76 | Синтез и исследование композитов на | electronic | Материалы XXIV Международной научно- | | Сартбаева К.М., |

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|---|---|---|---|---|---|
| | основе производных акриловых кислот, модифицированных бентонитовыми глинами. | | практической конференции студентов и молодых ученых. Томск, 2023. С. 163-165. | | **Искакова Т.К., Жунусбекова Н.М.** |
| 77 | Enhancing Soil Moisture Retention And Plant Growth With Composite Hydrogels. | electronic | International Conference on Polymers, Composites, Nano- and Biocomposites-2023 (ICPCNB-2023). 11-13 December 2023 | | Zhunusbekova N., Iskakova T. |
| 78 | N,N-диметилакриламидпен [(3-метилакрилоиламино-пропил] – үшметиламмоний хлориді негізіндегі жаңа катиондық поли-БАЗ. («Статья») | electronic | Труды сатпаевских чтений «Наука и технологии: от идеи до внедрения». Том II. Алматы: КазНИТУ им. К.И. Сатпаева, 12 апреля 2023. С. 671-675. ISBN 978-601-323-378-9 | 5 | **М.Б.Жүрсімбаева, Н.Ж. Сейткалиева, Г.К.Кусаинова, К.Ж.Абдиев** |
| 79 | Мониторинговые исследования качества атмосферного воздуха г. Алматы. | electronic | Безопасность жизнедеятельности и климатические риски развития территории Енисейской Сибири Международная научная конференция Красноярск, 16–20 октября 2023 года ; СФУ, 2023. – 136 с. ISBN 978-5-906477-47-7 | 2 | Ыбраимкул С., **Нурмакова С.М., Сарсембин У.К.** |
| 80 | Биологические методы очистки для загрязненных природных и сточных вод. | electronic | Безопасность жизнедеятельности и климатические риски развития территории Енисейской Сибири Международная научная конференция Красноярск, 16–20 октября 2023 года ; СФУ, 2023. – 136 с. ISBN 978-5-906477-47-7 | 2 | Копейкина Д.С., Тимурова Л.Е., **Нурмакова С.М**. |
| 81 | Reclamation of oily land using the Karazhanbas field as an example | electronic | Works of the International Scientific and Practical Conference "INTERNATIONAL SATBAYEV CONFERENCE 2023 (Satpayev Readings -2023). Science and technology: from idea to implementation." Almaty: KazNITU, 2023.-Volume 1.-291 p. ISBN978-601-323-379-6 | 7 | M.D. Aldakova, S.M. Nurmakova, B.Kh. Tusupova2, G.B. Kezembaeva, |
| 82 | Creation of an automated water quality control system in the Republic of Kazakhstan | electronic | ҰЛЫТАУ – Қазақстан металлургиясының бесігі. Труды международной научнопрактической конференции - Алматы, КазНИТУ им. К.И. Сатпаева, 2023, - 343 с. ISBN 978-601-323-370-3 | 6 | ***G.B. Kezembaeva, S.M. Nurmakova, J.A. Dyusenova, M.A. Gorbovskikh.*** |
| 83 | Қаражанбас кен орнының мұнаймен ластанған жерлерін қайта қалпына | electronic | ҰЛЫТАУ – Қазақстан металлургиясының бесігі. Труды международной научнопрактической | 7 | *Алдакова М. Д.,* ***Нурмакова С.М***. |

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| | келтіру | | конференции - Алматы, КазНИТУ им. К.И. Сатпаева, 2023, - 343 с. ISBN 978-601-323-370-3 | | |
| 84 | Reclamation of oily land using the Karazhanbas field as an example | electronic | Works of the International Scientific and Practical Conference "INTERNATIONAL SATBAYEV CONFERENCE 2023 (Satpayev Readings -2023). Science and technology: from idea to implementation." Almaty: KazNITU, 2023.-Volume 1.-291 p. ISBN978-601-323-379-6 | 7 | M.D. Aldakova, S.M. Nurmakova, B.Kh. Tusupova, G.B. Kezembaeva, |
| 85 | Sodium and potassium humatophosphates | electronic | IX International Russian-Kazakhstan scientific-practical conference "Chemical technologies of functional materials." - Russia, Novosibirsk, NSTU. - May 25-27, 2023 | 3 | Aldabergen AM. G.T. Balakaeva Aldabergenov M.K. A.S. Kalenova |
| 86 | Synthesis of liquid organomineral fertilizer | electronic | International Conference "International Satbayev Conference 2023" (Satpayev Readings - 2023). - Kazakhstan, Almaty, KazNITU - 12.04.2023 | 4 | Bubish Sh. Balakaeva G.T. A.S. Kalenova |
| | | | **Patents** | | |
| 87 | Method for preparing manganese phosphating concentrate (Utility model patent) | - | No. 7652. Bulletin No. 2022/0735.2 dated 09.12.2022 | - | **V.I. Kapralova** |
| 88 | Charge for production of water-soluble metal corrosion inhibitor (Patent for utility model) | - | No. 7655 Bulletin No. 2022/0686.2 dated 09.12.2022 | - | **V.I. Kapralova** |
| 89 | "Composite gel with ion-exchange properties" | | Decision to grant a utility model patent under application No. 2021/0086.2 dated 02.02.2021 | | Zhunusbekova N.M., Chinibaeva N.S., Kusainova G.K., Khudaibergenov N.S. |
| 90 | [(3-Methacryloamino) propyl] trimethylammonium chloride copolymer with n, n-dimethylacrylamide | | Application for invention No. 2023/0002.1 dated 04.01.2023 | | Zhursumbaeva, M. B., Seitkalieva, N. Zh., Abdiev, K. Zh. G.K. Kusainova, |

## 7. International cooperation

The Institute and the department continues to establish cooperation with partner universities and other organizations in foreign countries. Work is actively underway to invite foreign teachers with extensive experience in order to improve the educational process and exchange experience.

In 2022, the Department of CP&IE concluded the following international memorandums and agreements:

- Kremenchug National University named after Mikhail Ostrogradsky, Ukraine;
- National Research Tomsk Polytechnic University, Russia;
- Fergana Polytechnic Institute, Uzbekistan.

Cooperation with industry.

- LLP “INTEKNO SG (Intekno)” No. 927 dated December 28, 2021;
- LLP “INCREASE-FOOD” No. 08-118 08/31/2022;
- “EuroCircuit Technology Sdn Bhd” (ECT) No. 03-26 dated 03/03/2023 (Malaysia).

**Table 7.1. External and internal academic mobility of students**

| No. | Full name | EP, course | Country, partner university | Duration of training | Contact details |
|---|---|---|---|---|---|
| 1 | Utegenova Aruzhan Jumagaleevna | 6B05205 Chemical and biochemical engineering (Ecology), 4th year | Russia, St. Petersburg | 1.09.2022-31.12.2022 | 87475278873 |
| 2 | Tolegen Sabyrzhan Rysbeuly | 6B05205 Chemical and biochemical engineering (Ecology), 4th year | Russia, St. Petersburg State University | 1.09.2022-31.01 2023 | 87085279179 |

**Table 7.2. Foreign teachers invited to participate in the educational process of KazNRTU (including giving lectures on-line)**

| No. | FULL NAME. foreign teacher | Position, scientific (academic) degree | Country, name of partner university | Teaching disciplines, number of hours |
|---|---|---|---|---|
| 1 | Isti Yunita (together with the Department of M&MPI) | PhD | Assistant Professor of Department of Chemistry educatioru, faculty of Mathematics and Natural Sciences, University Negeri Yogyakarta | Effective catalyst with oxide as the active site and its application, 24 часа |
| 2 | Mikhalovsky S.V. (together with the Department of M&MPI) | PhD, Professor of Materials Chemistry | Great Britain | Development and improvement of transferable skills faculty, research assistants, undergraduates and doctoral students in materials science and engineering specialties, 72 hours |

| | | | | |
|---|---|---|---|---|
| 3 | Zhumamuratov D.K. | Ph.D., Associate Professor | Nukus Mining Institute at Navoi State Mining and Technological University | Water supply system for the city of Nukus, Problems of climate change and water resources in Uzbekistan. The problem of the Aral Sea and government measures on the problem of the drying up of the Aral Sea, 14 hours |
| 4 | Daminova Sh.Sh | Doctor of Chemical Sciences, Professor | National University of Uzbekistan | Solid extractants in hydrometallurgy of rare elements, 2 hours |
| 5 | Torambetov B.S. | PhD, Associate Professor | National University of Uzbekistan | Study of the structure of complex compounds by X-ray diffraction analysis, 2 hours |

*Participation of the teaching staff of the Department of CP&IE and M&MPI in the seminar as part of the "Visiting Professor" program. Isti Yunit, PhD, Universitas Negeri Yogyarta*

## Table 7.3. KazNRTU teaching staff invited to participate in the educational process of partner universities (including giving lectures on-line)

| No. | FULL NAME. Teaching staff of KazNITU | Position, scientific (academic) degree | Country, name of partner university | Teaching disciplines, number of hours | Coordinates of teaching staff of KazNITU (e-mail, phone) |
|---|---|---|---|---|---|
| 1 | Sh.N. Kubekova | Head Department, Ph.D., Associate Professor | Uzbekistan, National University University of Uzbekistan named after Mirzo Ulugbek | Modern problems of chemistry, 12 hours for undergraduates of the 1 course | s.kubekova@satbayev.university 8-708-567-3291 |
| 2 | A.S. Raimbekova | Senior lecturer, master | Uzbekistan, National University University of Uzbekistan named after Mirzo Ulugbek | Modern problems of bioorganic chemistry, for 1st year students | a.raimbekova@satbayev.university 8-701-778-0105 |

# 8. Investment projects

## Table 8.1 - Investment projects

| No. | Department | Investment projects | Sum | Note |
|---|---|---|---|---|
| 1 | CP&IE | Interactive panel, blinds (134 GMK) | 1 400 000 тг | For the 2021-2022 academic year (7 million in 2, 24, 26, 27 TTC) |

**Head of the Department of CP&IE**  **Sh.N. Kubekova**

*Considered at a meeting of the Department of CP&IE,*

*protocol No. 14 of June 21, 2023*