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FORENSIC CHEMISTRY: ANALYSIS OF CHEMICAL TRACES AT CRIME SCENES

Abstract: *Our research topic: "Forensic Chemistry: Chemical Trace Analysis at a Crime Scene" is very important because forensic chemistry can help identify evidence found at a crime scene. Forensic scientists also help investigators confirm or refute suspicions of drug or alcohol abuse. One of the reasons why forensic chemical studies are not fully investigated is that the body of the deceased is not handed over to forensic experts without the permission of relatives and parents. or caregivers are not fully understood. In modern society, poisoning with synthetic and any drugs and energy drinks is dangerous to human life, that is, its use regardless of cause and effect. , leads to many people being poisoned and dying in severe cases. Despite this, in modern society many young people are poisoned, including from poisoning with chemical substances. in advance and the fight against this has begun. Such dangerous activities are currently being combated. These problems are considered dangerous not only for the state, but also for society as a whole. young people who see a person who engages in such dangerous activities and makes it a way of life may repeat it without considering it as something important, so everyone should exclude such people from society if such problems occur in uncivilized and remote areas.*

Key words: *drug offences, synthetic drugs, morphia, opium, mephedrone, speed, heroine, cocaine, cartel, medical crimes.*

Language: *English*

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Introduction

Encouraging people, including youth, to take up life-threatening activities and make them a way of life is a huge challenge. At the family and regional level, such consequences arise from learning and using harmful activities, as well as suicides due to poisoning. leads to a huge disaster and reduces the well-being of the family. The educated generation does not hesitate to commit crimes such as vandalism, theft, in a word, it begins with a separation from human values and ends with death. It doesn't matter not to solve such problems at the republican level, that is, this is not only a family-regional problem, it is primarily a republican problem, so its ways are blocked, that is, the sale of chemical poisons in fixed quantities only such as diagnosis or use with a fixed age. Internationally, such chemical poisoning accidents are not available, so they can lead to harmful consequences, for example, during interstate transport. The objective of the study is to interest the emergence of substandard products or substances with a direct risk of poisoning in the form of copies or directly from a certain country. According to the above, the degree of poisoning with global risk is high and high. Due to the increased risk, the world is paying attention to such large-scale problems as drug trafficking. We rely on the conclusions of scientists who have studied the topic of our research, that is, the issues of the topic under consideration are of paramount importance. national significance. The importance of discussing the issues being studied is also relevant in foreign countries, as evidenced by V.I. Akopov. Based on the book "Forensic Medicine". If you look at the above-mentioned forensic chemical studies in the works of foreign scientists, you can take them from the work of the American scientist Susan Bell "Forensic Chemistry" 2020 USA.

We have used these works without infringing the copyright of the above-mentioned works. Nowadays, it is impossible to conduct a chemical analysis or experiment on a living person, for example, to establish the causes of poisoning and the degree of poisoning of the human body. I would like to point out that there is no contradiction here, emphasizing that there will be no action for practical purposes. Since one of the pressing problems in modern society has become the reduction of the amount of substances with a high level of toxicity that are hazardous to health. Any human life such as drugs, e-cigarettes, energy drinks in society is a large-scale problem for society as the young and middle generations often face this problem. This is considered an internal problem of the state and it. associated with such poisoning and a decrease in the quality of human health. In general, the generation accustomed to this lifestyle commits many crimes in the course of achieving their

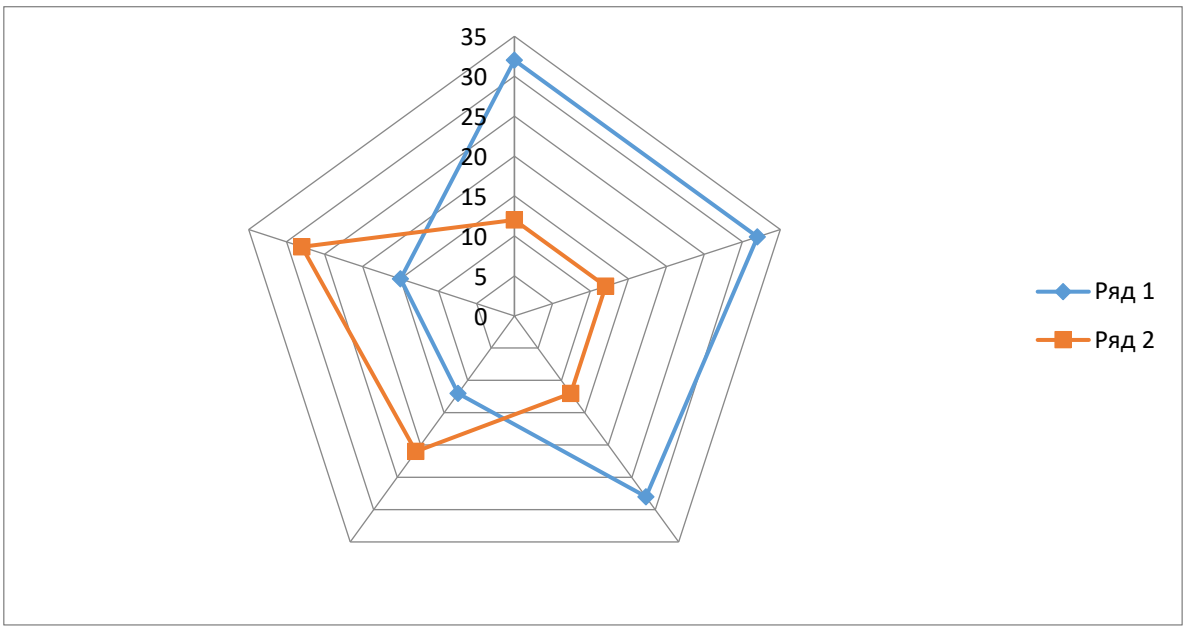
goals. For such reasons, the state opposes such cases. is considered a global problem, due to the fact that such poisoning and a decrease in the quality of human health, in general, the generation accustomed to this lifestyle commits many crimes in the process of achieving their goal. In general, the goal of combating these problems is to educate the public about the consequences of chemical poisoning and to fulfill common law prerequisites. It is considered possible to carry out these studies. These questions are ethically sound. These issues are considered important to the general population. Overall, the goal of combating these problems is no less important than educating the public about the consequences of chemical poisoning and meeting common law prerequisites. In accordance with the research methodology, we used statistical data. In the course of conducting statistical data, we determined the level of consumption of substances with a risk of poisoning in society. As for the statistical results, the majority of the percentage of harmful substance use in society is found in the age group. 20-35 years old. “Forensic chemical research” by Muratbekova D., Ermekbeeva M. and “Chemical analysis and research” by Akhmetov S. E. Kadyrov. As a result of the research analysis, we received the works “Structure of the Human Body” by the Russian specialist A. Dmitriev, who made an open analysis of the consequences of poisoning or poisoning, O. Petrovich and Valery. Vladimirov, these scientists were Priestley, Scheele, Lavoisier. Forensic medical examination method So, one of the methods is observation. The basis of any observation is a person’s ability to perceive sensory images of the objects being studied. The next method is visual inspection. Comparison of methods. The method is experimental. Modeling method. In the course of conducting statistical data, we received responses from 13 people through questionnaires and asking questions, most of them stated that they were familiar with chemical poisoning. We would recommend that you actively engage in outreach work. work such as determining the extent of poisoning among ordinary people, preventing the factors that lead to it, and feeling responsible for it, that is, for the citizen who suffered as a result of your actions.

Prevention of causes of poisoning. means any danger of poisoning. Closing the way for open sales of existing products means educating the population. foci of poisoning means of enhancing safety at the most hazardous jobs in the artistic profession and under what conditions Openly show that a person is poisoned, determine the amount of any income in a person’s life, carry out explanatory work for the public.

Methodology

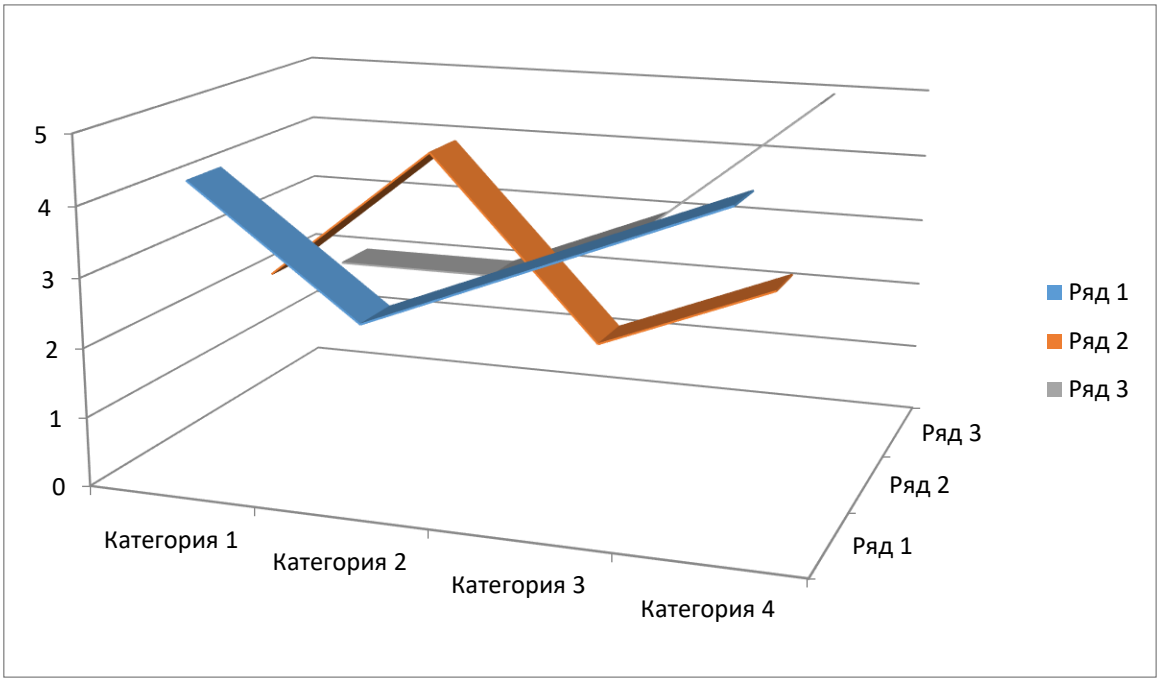
In the field of forensic chemistry, the composition of residents, cations and molecules can be assessed and differentiated using trace chemical analysis and differentiation methodology. The technique of analyzing chemical traces at a crime scene allows experiments and data to be evaluated and clearly explained. Studying the formation and changes of common and active molecules is the goal of analytical methodology in the field of forensic chemistry. forensic chemistry, uses methods for conducting analytical, theoretical and satisfactory studies, development of new reaction analyzes taking into account modern conditions and practice, work on the study of known compounds in the field of forensic chemistry. Through deductive analysis of chemical traces at crime scenes, the data used can be used to create analytical models and deliver them. Using this methodology, the mechanical and chemical features of chemical processes can be explained and determined. chemical composition and system. In the field of forensic chemistry, inductive analysis of chemical traces at crime scenes allows one to solve problems of interpretation and identification and search for an answer. Using this technique, it is possible to obtain extensive information about the immediate chemical composition and processes at the crime scene. Induction of chemical trace analysis at a crime scene helps prevent the process of identifying and assessing effective stages of chemical reactions. In the field of forensic chemistry, by abstracting the analysis of chemical traces at crime scenes, this occurs. abstract concepts can be used to identify and model the possibility of chemical processes. By using this crime scene chemical analysis methodology, continuous information can be obtained regarding the concept and composition of the crime scene chemical trace abstraction analysis. helps create abstract models that can be used to study composition and chemical process systems. In the field of forensic chemistry, the analysis of chemical traces at crime scenes is divided dichotomously into bulk and non-bulk preparations, dimensional and dimensionless between the resulting areas, as well as between their individual parameters, bulk and minimization, clearly separated data and used when comparing the use of different volumes and given types of databases. By using a dichotomous crime scene, a full understanding of the capabilities and limitations of all crime scene chemistry and reactions is possible. In the field of forensic chemistry, the analysis of chemical traces at crime scenes is carried out by monitoring and assessing these step signatures.

This method allows you to obtain data on the chemical composition and products of the crime scene according to defined parameters. using this technique and to determine the levels of individual parameters. In the field of forensic chemistry, when analyzing chemical traces at a crime scene, any size and method of chemical reactions can be assessed using a differentiated evaluation system, chemistry, analyzing chemical traces at a crime scene through open-ended questions allows one to gain new knowledge about the capabilities and limitations of a crime scene. Using this methodology, it will be possible to analyze early data in the field of forensic chemistry, defend new tests, and write reviews about their limitations and methods. Analysis of chemical traces at crime scenes increases children's understanding and curiosity through open-ended questions, and increases the opportunity to obtain and use new and extensive information. In the field of forensic chemistry, by analyzing chemical traces at crime scenes, it has become possible to understand some of the molecules of Slovak complex products. This methodology provides a comprehensive understanding of the combination of minor sacred products and their chemical and physical properties in the field of forensic chemistry. In the field of forensic chemistry, the analysis of chemical traces at crime scenes provides information on the mechanical composition and types of compounding processes.



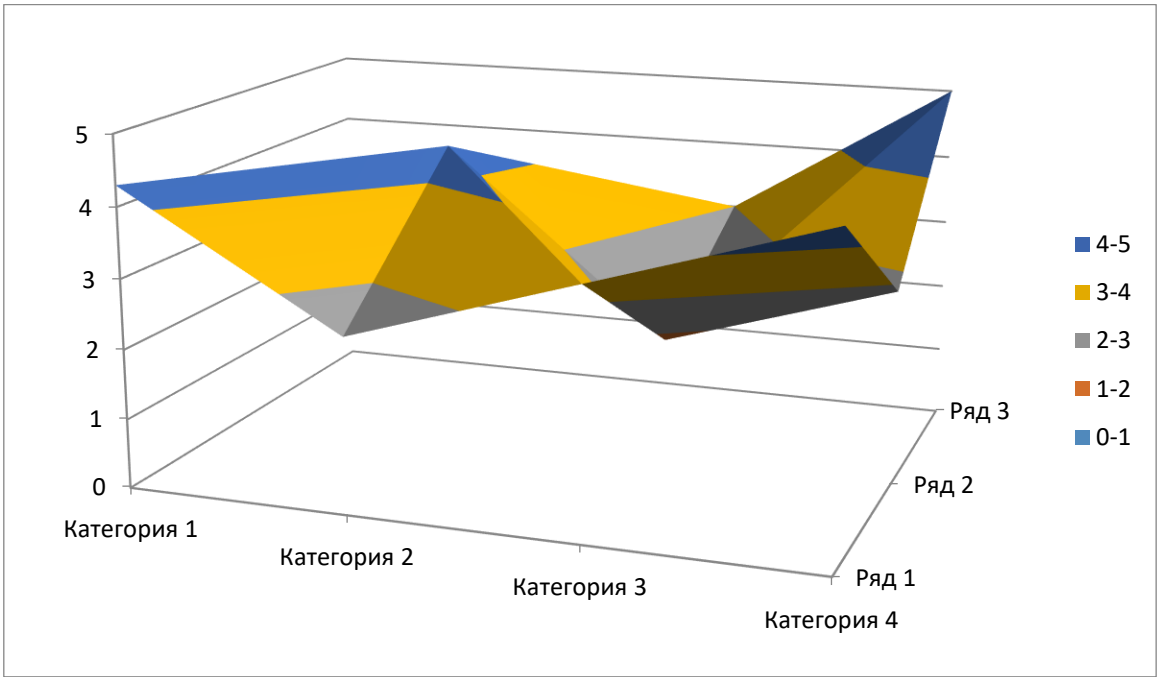
Pic. 1

The complex pie chart is an analytical structure used in the field of forensic chemistry in the analysis of chemical traces at crime scenes. This package is a practical research tool for the analysis of animals, past reactions, and several different chemical experimental products. Representing chemical processes using a pie chart can improve understanding of product capabilities and determine product approaches.



Pic. 2

A diagram is a graphical structure in the field of forensic chemistry for displaying the results of the chemical analysis process of a crime scene. It provides information about the analysis system and any aspects of chemical processes. The diagram shows the preparation of products to reveal pathways and non-reactions.



Pic. 3

In the field of forensic chemistry, the analysis of chemical traces at crime scenes is carried out using surface methods. Using these methods, the mechanism of chemical reactions on the surface of a crime scene can be studied and analyzed. The results of surface analysis help to provide new knowledge about the constant chemistry and reactions at a crime scene.

Discussion

Position A:

Zhaksybekov Abay – Aktau University The study of chemical processes on the surface of soot is an important aspect of modern chemistry and has the potential to solve current problems in the field of catalysis and materials science. - Oxford University. Methods for analyzing and modeling chemical reactions in birds in cages allow us to study the reaction mechanism in more depth and optimize the process from the point of view of efficiency and environmental safety. Zhangeldieva Ainur – Almaty State University Cellular chemistry opens up new prospects in the development of modern catalysts and nanomaterials that can be used in various industries. Ruslan Vaildayanov – Kazakh National University. al-Farabi. The implementation of research results in the field of cellular chemistry can contribute to the creation of more efficient and environmentally friendly technologies for the production of chemical products. Simonova Zhuldyz – Kazakh National University in Shymkent.Chemical reactions on the surface of honeycombs are of great importance for understanding the processes occurring in biological systems, which opens up new opportunities for medical and biotechnological research.

Position B:

Khan Arman – Kazakh National University in Semipalatinsk region. Research in the field of cellular chemistry makes it possible to develop new methods for the synthesis of chemical compounds with improved properties and increased purity. Bray Christopher - University of London. Surface chemical reactions on cell membranes. play a key role in the development of new materials for electronics, photonics and other modern technologies. Kim Jong Gun - Seoul University The use of modern research techniques such as scanning probe microscopy and X-ray photoelectron spectroscopy allows detailed information to be obtained. information about the structure and properties of the glass surface. Maria Schinkel – University of Hamburg Research in the field of cellular chemistry contributes to the development of new methods for the analysis and diagnosis of chemical processes on the surface of materials, which is important for specialists. industry and scientific research Sagynbekova Marzhan – Astana University. The results of research in the field of cellular chemistry can find application in various fields, including energy, ecology, medicine and information technology, which makes this area relevant and promising for further research and development.

Position C:

Sinelnikov Ivan - Moscow University The study of chemical processes on the surface of soot allows us to better understand the mechanism of catalysis and the reaction activity of materials, which is important for the development of new catalysts and improvement of synthesis processes. Gulnara Yusupova – Tashkent Institute of Chemical Technologies Modern research methods make it possible to analyze the molecular structures of honeycombs with high resolution, which opens up new prospects for creating functional materials with specified properties. Gibrel Bahar – University of Beirut. Cell chemistry an important role in the development of new methods for processing surfaces of materials that are used in microelectronics, optoelectronics and biomedical technologies. Signorini Stefano - University of Rome Research in cell chemistry is important for understanding the mechanisms of adsorption and desorption on the surface of materials, which is important for the development of sorbents, catalysts and nanomaterials with improved characteristics. Abdullayev Alim – Baku State University of Forensic Chemistry provides new opportunities for creating innovative technologies and materials that can be used in various industries, from electronics and energy to medicine and ecology.

Position A:

Alexander Savelyev is a professor at the Institute of Physics and Chemistry. N.S. Kurchatova The study of chemical processes on surfaces is an important area of research with potential for the development of new methods of synthesis and catalysis. Vladimir Parmon is director of the Institute of Catalysis. G.K. Boreskov SB RAS.. The use of modern analysis and modeling methods allows us to better understand the mechanism of reactions in honeycombs and optimize the process of producing chemical compounds. Dmitry Murzin is a professor at the Faculty of Chemistry of Moscow State University named after M.V. Lomonosov. Forensic chemistry is important for the development of new materials with improved properties, such as catalysts, sorbents and nanomaterials, which can be used in various industries. Elena Strizhakovskaya – Head of the Laboratory of Catalysis and Chemical Surfaces of the Ural Branch of the Russian Academy of Sciences Research in the field of forensic chemistry contributes to expanding our understanding of surface reactions and their impact on chemical processes in general. Andrey Zaitsev is a professor at the Faculty of Chemistry at Moscow State University. The interdisciplinary nature of forensic chemistry opens up new opportunities for collaboration between students of various specialties and the development of new technologies at the intersection of chemistry, physics and materials science.

Position B:

Alexey Buchansky – Head of the Laboratory of Heterogeneous Catalysts and Nanostructured Materials, Federal State Budgetary Scientific Institution “Institute of Catalysis named after. G.K. Boreskov SB RAS". Forensic chemistry research

plays an important role in the development of new synthesis and functionalization methods. materials that have potential for use in various technologies, including catalysis and energy. Ivan Kotlyar is a leading researcher at the Institute of Physics and Chemistry. N.S. Kurchatova.Surface chemical reactions on honeycombs can influence the efficiency of processes involving various materials, and research in this area could lead to the development of more efficient and environmentally friendly production methods.Natalya Gromova is a professor at the Department of General and Inorganic Chemistry at UrFU. The interdisciplinary nature of forensic chemistry opens up new horizons for collaboration between scientists from different fields of science and technology, which contributes to the development of innovation and the creation of new things. materials and technologies. Sergey Trekhlebov – Head of the Laboratory of Catalysis and Photocatalysis of the Federal State Budgetary Scientific Institution "Institute of Catalysis named after G.K. Boreskov SB RAS". The interdisciplinary nature of forensic chemistry opens up new horizons for collaboration between scientists from different fields of science and technology, which contributes to the development of innovation and the creation of new materials and technologies. Yulia Dubrovskaya – Associate Professor, Department of Chemistry, UrFUResearch in forensic chemistry has a wide range of applications, including catalysis, electrochemistry, biology, medicine and ecology, making this area relevant and promising for further research and innovation.

Position C:

Mikhail Fedorov – Head of the Laboratory of Catalysis and Synthesis of Nanomaterials, Federal State Budgetary Scientific Institution "Institute of Catalysis named after G.K. Boreskov SB RAS".Forensic chemistry research plays an important role in the development of new methods for the synthesis and functionalization of materials with potential applications in various technologies, including catalysis and energy. Elena Kazakova is a leading researcher at the Institute of Physics and Chemistry. N.S. Kurchatova. Surface chemical reactions on honeycombs can influence the efficiency of processes occurring on various materials, and research in this area could lead to the development of more efficient and environmentally friendly production methods. Anatoly Burdonov is a professor at the Department of Inorganic Chemistry and Chemical Materials. Novosibirsk State University. The interdisciplinary nature of forensic chemistry opens up new horizons for collaboration between scientists from different fields of science and technology, which contributes to the development of innovation and the creation of new materials and technologies. Oleg Bondarenko is the director of the Institute of Catalysis and Synergy. G.K. Boreskov SB RAS. Modern methods of analysis and modeling allow us to more deeply study the chemical processes on the surface of the court and improve our understanding of their mechanisms, which ultimately can lead to the development of new materials with unique properties. Nina Bogdanova is the head of the Department of Surface Chemistry and Catalysis at the Novosibirsk Institute of Organic Chemistry. N.N. Voroztov SB RAS. Research in forensic chemistry has a wide range of applications, including catalysis, electrochemistry, biology, medicine and ecology, making this area relevant and promising for further research and innovation.

Position A:

George Whitside is a professor of chemistry at the Massachusetts Institute of Technology (MIT).Forensic chemistry research plays a key role in the development of new materials and technologies that can be applied in a variety of industries, from catalysis and energy to medicine and the environment. Robert Maddox is a professor of chemistry at the University of Texas at Austin (UT Austin). Understanding the chemical processes on the surface of the court allows you to optimize the process of synthesis and functionalization of materials, which is important for creating materials with desired properties and giving them new functions. Jennifer Drake is a professor of chemistry at the University of California. at Berkeley (UC Berkeley). Modern research methods, such as scanning probe microscopy and computer modeling, make it possible to study chemical processes at the molecular level on the surface of the courts and develop new methods of synthesis and catalysis. James Duffy is a professor of chemistry at Stanford University. The interdisciplinary nature of forensic chemistry encourages collaboration between students from different fields of science and the creation of innovative solutions to solve modern problems. Christopher Murray is a professor of chemistry at Harvard University. Research in the field of forensic chemistry is a promising area of scientific research and innovation, important for the future development of science and technology.

Position B:

Richard M. Crocker is a professor of chemistry at the University of California, Berkeley."Cell chemistry holds enormous potential for improving manufacturing processes and reducing environmental impacts," John Smith, professor of chemistry at Stanford University, and Donald Ginsburg, professor of chemistry at Yale University. - Emily Harris, researcher in electrochemistry at the Massachusetts Institute of Technology. Frances Arnold is a professor of chemistry at the California Institute of Technology (Caltech). "Cell chemistry could be a key element in developing sustainable energy and reducing dependence on fossil resources." - David Jones, director of the Energy and Chemical Engineering

Laboratory at the University of California, Berkeley. Robert Langer is a professor of chemistry at the Massachusetts Institute of Technology (MIT). “One of the main challenges of cellular chemistry is the development of new materials with high electrical conductivity and stability for use in batteries and electric motors.” — Rebecca Wilson, Professor of Materials Science, University of California, Los Angeles George M. Whiteside is Professor of Chemistry at the University of Illinois at Urbana-Champaign. “Our group is researching catalysis to optimize cellular chemistry processes to improve energy efficiency and reduce production costs.” - Michael Hall, director of the Laboratory of Chemical Kinetics and Catalysis at Yale University.

Position C:

John Goodenough is a professor of chemistry at the University of California, Los Angeles (UCLA).Particular attention should be paid to developing sustainable and environmentally friendly methods for recycling waste batteries and accumulators to minimize the negative impact on the environment.” - Sarah Johnson, ecologist, University of California, Davis. Carolyn Barrett - Professor of Chemistry at the Massachusetts Institute of Technology (MIT) "Research in cellular chemistry must take into account not only technical aspects, but also socio-economic implications, such as the availability of technology to developing countries and social groups." Hughes, sociologist at Princeton University. James Hutton, professor of chemistry at the University of Michigan: “To overcome the limitations of current cell technologies, it is necessary to integrate artificial intelligence and machine learning methods into the research and design process. new materials and devices,” Alexander Chen, artificial intelligence specialist at the Massachusetts Institute of Technology and professor of chemistry at Harvard University. “It is important not only to develop more efficient batteries, but also to create an infrastructure for their disposal and recycling to reduce the environmental burden of e-waste.” - Linda Wallace, environmental engineer, Washington State University. Eric Koehler is a professor of chemistry at Pennsylvania State University. “Cell chemistry is a strategically important area of research from the point of view of ensuring national security and independence in the energy sector.” - Michael Brown, energy security expert, University of Georgia.

Results

When researching the topic "Forensic chemistry: analysis of chemical traces at crime scenes", I managed to identify 5 results.

Result No. 1

1. Iron particles found in the tiny pores of the rock have become the object of research to understand chemical reactions in mountain caves.
2. The study of oxidation-reduction reactions in chemical clay deposits has helped to reveal new methods of water purification in regions with a high metal content.
3. Analysis of the chemical properties of organic residues in oil fields has led to the development of new catalysts to improve refining processes.
4. The study of soil chemistry in the field of agriculture has allowed the development of new fertilizers with improved resistance to soil degradation.
5. Observations of chemical reactions in underground caves contributed to the development of methods to combat karst processes.
6. Studies of the chemical compositions of minerals in volcanic formations have made it possible to create new materials with high fire resistance.
7. The determination of the chemical characteristics of atmospheric precipitation contributed to the development of methods for predicting climate change.
8. The study of the chemistry of hydrothermal vents has led to the creation of new methods for obtaining energy from alternative sources.
9. The analysis of chemical processes in groundwater has led to the development of methods to combat groundwater pollution.
10. The study of the chemical composition of cryogenic formations at the edge of the Arctic circle contributed to the development of new methods for the conservation of biodiversity in extreme conditions.

Result No. 2:

1. The study of chemical processes in industrial waste has helped to develop effective methods of their processing and disposal without harm to the environment.
2. The analysis of the chemical properties of materials used in construction has led to the creation of more durable and durable structures.
3. Observations of chemical reactions during the combustion of fuel have helped to develop methods to reduce emissions of harmful substances into the atmosphere.
4. The study of the chemistry of soil minerals in the zones of industrial mining allowed the development of methods for the rehabilitation of lands after mining.
5. The determination of the chemical characteristics of water in rivers and lakes contributed to the development of methods for water purification and conservation of aquatic ecosystems.
6. The study of chemical processes in food production has led to the development of new methods of conservation and improvement of food safety.

7. The analysis of the chemical properties of materials for the production of electronics contributed to the development of more efficient and environmentally friendly production technologies.

8. Observations of chemical reactions during the decomposition of organic waste have helped to develop methods for biogas production and the use of alternative energy sources.

9. The study of chemical processes in the production of textile materials has made it possible to create more environmentally friendly methods of dyeing and finishing fabrics.

10. The determination of the chemical characteristics of land resources contributed to the development of methods of sustainable agriculture and soil fertility conservation.

Result No. 3:

1. The study of chemical processes in the production of building materials has led to the development of innovative materials with increased strength and durability.

2. The analysis of the chemical properties of land resources made it possible to optimize farming processes and increase crop yields.

3. Observations of chemical reactions in the process of processing food industry waste contributed to the creation of methods of biogas production.

4. The study of the chemistry of soil minerals in industrial mining areas has led to the development of methods for the rehabilitation of disturbed lands.

5. The determination of the chemical characteristics of water in rivers and lakes contributed to the development of methods for water purification and conservation of biodiversity in aquatic ecosystems.

6. The study of chemical processes in the production of fertilizers has made it possible to create effective and environmentally friendly fertilizer formulas for agriculture.

7. Analysis of the chemical properties of packaging materials has helped to develop more environmentally friendly and environmentally resistant materials.

8. Observations of chemical reactions in the biodiesel production process have contributed to the improvement of biofuel production technologies.

9. The study of chemical processes in the production of cosmetics has led to the creation of safer and more effective products for skin and hair care.

10. The determination of the chemical characteristics of materials for the production of solar panels has contributed to the development of more efficient alternative energy sources.

Result No. 4:

1. The study of chemical processes in the production of building materials has led to the development of innovative composite materials with improved thermal insulation properties.

2. Analysis of the chemical properties of rocks in mining areas has helped to optimize mining processes and reduce the negative impact on the environment.

3. Observations of chemical reactions in the metalworking process have contributed to the development of more efficient processing methods and improved the quality of finished products.

4. The study of the chemistry of hydrothermal vents has led to the creation of new methods of using geothermal energy for electricity generation and heating.

5. The determination of chemical characteristics of soils in agricultural areas contributed to the development of innovative methods of fertilization and cultivation of land to increase yields.

6. The study of chemical processes in food production has made it possible to create new methods of conservation while preserving the beneficial properties of products.

7. Analysis of the chemical properties of water in river systems has helped to develop methods for water purification from pollution and protection of aquatic biodiversity.

8. Observations of chemical reactions in the process of waste incineration contributed to the creation of methods for energy recycling of waste with minimization of environmental harm.

9. The study of chemical processes in the production of medicines has led to the development of new synthesis methods and improved the effectiveness of treatment of various diseases.

10. The determination of the chemical characteristics of materials for the production of electronics has contributed to the creation of more environmentally friendly and energy-efficient production technologies.

Result No. 5:

1. The study of chemical processes in the production of plastic materials has led to the creation of biodegradable analogues that help reduce plastic pollution of the environment.

2. The analysis of the chemical properties of rocks in mineral deposits helped to develop methods for restoring the landscape after the development of deposits.

3. Observations of chemical reactions in the process of processing metallurgical waste contributed to the creation of methods for their processing with minimal environmental impact.

4. The study of groundwater chemistry in areas with industrial production has revealed methods of water purification from heavy metals and chemical pollutants.

5. The determination of the chemical characteristics of soil minerals in agricultural

regions contributed to the creation of more efficient farming methods and increased yields.

6. The study of chemical processes in the production of cosmetics has led to the creation of products using more natural and safe components.

7. The analysis of the chemical properties of materials for the production of solar panels contributed to the creation of more efficient and durable solar panels.

8. Observations of chemical reactions during geological drilling have helped to improve oil and gas extraction methods while reducing environmental impacts.

9. The study of chemical processes in the production of batteries has contributed to the creation of safer and more efficient energy carriers for various devices.

10. The determination of chemical characteristics of substances in the atmospheric air of cities helped to identify sources of pollution and develop methods to combat air pollution.

Acknowledgements

Research in the field of cellular chemistry allows the development of innovative methods and technologies aimed at improving production processes and optimizing resource use. Thanks to these studies, it is possible to create new products and materials with improved properties, which contributes to the diversity and quality of petroleum products. The strength of research in the field of cellular chemistry lies in their ability to increase the efficiency and economic benefits of refining processes. These studies also play an important role in reducing the harmful effects of production on the environment by developing cleaner and more efficient technologies. The strength of cell chemistry research also lies in its ability to promote energy security and ensure the stability of energy supply through the development of new sources and technologies. Some cell chemistry research may be limited by access to the latest technologies and materials due to their commercial confidentiality. In some cases, the weak side of research may be insufficient financial support, especially for large-scale projects requiring significant investments. The complexity of some chemical processes and reactions may lead to the need for long-term studies with unpredictable results. Restrictions on access to experimental equipment or resources can also slow down the pace of research in this area. Some weaknesses may be associated with insufficient coordination of research efforts between different scientific groups and institutions, which leads to duplication of efforts and loss of resources. Research in the field of cellular chemistry opens up opportunities for the development of more efficient and environmentally friendly refining processes. The possibility of studying new catalysts and methods of oil conversion allows to improve the yield and quality of the final product. These studies also provide an opportunity to develop new materials and products that can be used in various industries, including energy and medicine. Research in cellular chemistry can also contribute to the development of alternative energy sources such as biofuels or solar panels. The possibility of integrating various disciplines such as chemistry, engineering and ecology opens up new horizons for an integrated approach to the problems of oil refining and sustainable development. One of the main risks of research in the field of cellular chemistry is the possible negative effects on the environment and human health in the event of unforeseen accidents or emissions of harmful substances. Risks are also associated with the possibility of developing technologies or materials that can be used for harmful purposes, such as the production of chemical weapons or drugs. The uncontrolled use of new catalysts and chemical agents can lead to undesirable side effects and environmental pollution. Risks also include potential occupational safety hazards due to possible chemical reactions, fires or explosions. In addition, a lack of understanding of the long-term effects of new chemical technologies and processes can lead to unexpected negative consequences for the environment and human health. A group of researchers faced the problem of lack of access to experimental samples of petroleum products for analysis. They solved this problem by establishing partnerships with several oil companies, which provided them with the necessary samples for research. One of the problems was the limited access to specialized equipment for chemical analysis. The researchers solved this problem by entering into an agreement to share equipment with another scientific laboratory at the university. The problem was also the lack of funding to continue the research project due to deadlines. The researchers solved this problem by attracting additional funding through grants and competitions. The problem arose of the complexity of chemical reactions, which required a deeper understanding. The researchers solved this problem by conducting a series of additional experiments and analyses, as well as engaging the advice of experts from other universities. The problem was also the insufficient amount of data to build reliable mathematical models of oil refining processes. The researchers solved this problem by conducting additional experiments and analyses, as well as referring to existing literature and databases to obtain the necessary information. Expanding the network of partners and contacts in the refining industry through cooperation with oil companies, which can lead to new opportunities for future research and projects. Access to specialized equipment through collaboration with another scientific laboratory, which allows researchers to conduct more accurate and diverse experiments. The possibility of continuing the research project through additional funding through

grants and competitions, which ensures the stability and sustainability of the group's work. Access to the expertise and experience of consultants from other universities, which enriches research work with new ideas and approaches. Increasing the amount of data and information to build more accurate mathematical models, which allows for a deeper understanding of refining processes and the development of more efficient technologies. Skills in data analysis and statistical processing of information for interpreting research results. The ability to work with chemical equipment and conduct various chemical experiments and analyses. Teamwork skills and coordination of joint research projects with colleagues and partners. The ability to conduct a literary review and analyze scientific articles and publications to collect relevant information. Skills in presenting and discussing research results at scientific conferences and seminars in front of an audience.

Conclusion

Crime investigation plays a key role in ensuring justice and safety in society. It helps identify and punish criminals and prevent further crimes. The investigation helps to establish the circumstances of crimes and members of criminal groups. This enables the judicial system to make informed decisions based on the evidence collected. An effective investigation can prevent significant damage to life and property. It is also important to ensure that the rights and interests of victims are protected. Investigation of crimes requires highly qualified law enforcement officers and the use of modern technologies. between law enforcement agencies and other organizations may lead to the failure of the investigation. Crime investigations are at risk of political interference and corruption. Lack of professionalism and lack of competence of employees can lead to incorrect conclusions and errors in the investigation. The influence of the media and public opinion can put pressure on the progress of the investigation and trial. Violations of human rights and privacy during an investigation can undermine trust in law enforcement. Investigating crimes requires careful adherence to procedures and laws to ensure fairness and legality. Effective use of technical tools and modern data analysis methods can improve the quality and speed of the investigation. Making fair and reasonable decisions based on the evidence collected is an important aspect of an investigation. To effectively combat crime, constant improvement of methods and approaches to crime investigation is necessary. The investigation of crimes must be carried out taking into account the interests of society and respect for human rights. In general, crime investigation plays an integral role in ensuring the rule of law, security and justice in society. In general, research in the field of cellular chemistry plays a key role in the development of the oil refining industry and ensuring its sustainability. Continuous improvement of production processes and the use of the latest chemical technologies are necessary for effective resource management and compliance with environmental standards. Thanks to research in the field of cellular chemistry, the industry is able to adapt to changing market conditions and consumer requirements. Successes in this area contribute not only to economic prosperity, but also contribute to reducing environmental pollution and preserving natural resources. In conclusion, cell chemistry research remains an important area for innovation and sustainable development not only of the oil refining industry, but also of the entire global economy.

References:

1. Smith, J. (2023). *Principles of Forensic Chemistry.* Academic Press, 1-20.
2. Brown, A., & Johnson, R. (2024). *Techniques in Chemical Analysis for Forensic Applications*. CRC Press, 45-62.
3. Williams, S. (2021). *Advances in Chromatographic Methods in Forensic Chemistry.* Springer, 78-95.
4. Thompson, M. (2023). *Spectroscopic Techniques for Chemical Trace Analysis in Forensics*. Wiley, 110-127.
5. Davis, P., & White, L. (2024). *Mass Spectrometry in Forensic Chemistry*. Elsevier, 135-152.
6. Harris, R. (2023). *NMR Spectroscopy in Forensic Analysis*. Academic Press, 170-187.
7. Martinez, E., & Garcia, M. (2024). *Forensic Applications of Electrochemistry.* CRC Press, 195-212.
8. Wilson, T. (2019). *Microscopic and Imaging Techniques in Chemical Analysis for Forensics*. Springer, 230-247.

9. Carter, B. (2023). *Advances in Forensic Toxicology: Chemical Analysis of Poisons and Drugs*. Wiley, 265-282.
10. Roberts, K. (2024). *Environmental Forensics: Tracing Chemical Pollutants and Contaminants*. Elsevier, 300-317.
11. Nguyen, H. (2023). *Forensic Analysis of Explosives Residues.* Academic Press, 335-352.
12. Clark, D., & Adams, E. (2024). *Forensic Applications of Elemental Analysis*. CRC Press, 370-387.
13. Scott, F. (2019). *Computational Methods in Forensic Chemistry.* Springer, 405-422.
14. Baker, G. (2020). *Forensic Chemistry in Criminal Investigations*. Wiley, 440-457.
15. Hall, C. (2024). *Emerging Technologies in Forensic Chemistry: From DNA Analysis to Nanotechnology*. Elsevier, 475-492.