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БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»

М А Т Е Р І А Л И

105-ї підсумкової науково-практичної конференції
з міжнародною участю
професорсько-викладацького персоналу
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Матеріали підсумкової 105-ї науково-практичної конференції з міжнародною участю професорсько-викладацького персоналу Буковинського державного медичного університету, присвяченої 80-річчю БДМУ (м. Чернівці, 05, 07, 12 лютого 2024 р.) – Чернівці: Медуніверситет, 2024. – 477 с. іл.

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У збірнику представлені матеріали 105-ї підсумкової науково-практичної конференції з міжнародною участю професорсько-викладацького персоналу Буковинського державного медичного університету, присвяченої 80-річчю БДМУ (м. Чернівці, 05, 07, 12 лютого 2024 р.) із стилістикою та орфографією у авторській редакції. Публікації присвячені актуальним проблемам фундаментальної, теоретичної та клінічної медицини.

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from python code. It has been actively developed over several years and has a solid base of users in imaging and therapy projects. Popularity of mobile applications require proper language. And JAVA is a perfect match. The Java machine learning library provides several machine learning algorithms, and the Neuroph makes it possible to design neural networks.

Conclusions. Currently, AI is the most popular digital information industry. This also includes the dynamic medical industry. Current developments in Python and JAVA demonstrate that these languages suit well for the need of progressing medical industry. There are several pilot projects on the implementation of AI technologies in clinical centers of the UK and USA. It will attract more companies, more funds for development of software programs, electronic devices, mobile applications, home use gadgets etc.

Tkachuk I.G.

SnS/P-InSe THIN FILM STRUCTURES

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Introduction. In the modern world of semiconductor materials there is an active phase of research and obtaining new materials for use in thin-film solar cells and various types of electronic sensors. The main condition of the researches is the simplicity, cheapness of production and quantity of this material in the natural environment. Tin monosulfide SnS is a promising semiconductor material for optoelectronic applications with a band gap of 1.2÷1.6 eV and a high absorption coefficient. In addition, SnS is an environmentally safe and potentially affordable photovoltaic material.

The aim of the study. Creation of p-SnS/n-InSe heterojunction for implementation in laser technologies.

Material and methods. P-SnS/n-InSe heterojunctions were produced by the method of low-temperature spray pyrolysis. The advantage of this technology lies in its simplicity and cheapness. An aqueous solution of the appropriate composition was sprayed onto the InSe substrate, which was placed on the heater. The substrate was made of single-crystal n-InSe grown by the Bridgman method. Thin films of tin sulfide SnS with a thickness of 0.5 μm were made from a 0.1 M aqueous solution of tin dichloride $SnCl_2$ $2H_2O$ and $(NH_2)_2CS$ (99%). The solution was prepared in bidistilled water, the ratio of components [Sn]:[S] was equal to 1:3, which was provided by the appropriate solvent of molar masses of chemical reagents that participated in the formation of the film on the surface of the InSe substrate during pyrolysis. The pyrolysis temperature for obtaining the film was T = 796 K, the specific resistance of the film was ρ = 50 kΩ cm.

Results. At small direct displacements V = 0÷1 V, the graphical dependence can no longer be described by a formula,

$$I = I_s\left[\exp\left(\frac{e(V - IR_s)}{nkT}\right) - 1\right] + \frac{V - IR_s}{R_{sh}}$$

but a power-law dependence I = a•V m is observed, where m ≈ 1.5 for T < 294 K and m ≈ 1 for T > 294 K. We assume, that the value m ≈ 1.5 indicates the dominance of the current limited by the space charge in the ballistic regime (Child-Langmuir law), and m ≈ 1 is due to the current flowing through the shunt resistance. Thus, with increasing temperature at small direct displacements, the shunt resistance begins to play a decisive role in charge transfer. The spectral dependence of the quantum efficiency of the p-SnS/n-InSe heterostructure irradiated from the side of the SnS film is in the photon energy range of 1.2÷3.2 eV with a maximum at 1.45 eV, which corresponds to the SnS band gap. The long-wavelength edge of photosensitivity at hν = 1.2 eV is caused by the fundamental absorption edge in n-InSe. P-SnS thin films are polycrystalline, as a result of which the eigenabsorption edge is blurred due to the partial absorption at the grain boundaries compared to single-crystalline materials.

Conclusions. A photosensitive p-SnS/n-InSe heterojunction was produced by the method of low-temperature spray pyrolysis. I was measured in the temperature range from 247 K to 333 K at forward and reverse biases of the p-n junction (V = –5÷5 V). It was established that the flow of current is mainly determined by two factors –tunnelling of charge carriers and shunt resistance. The first one is decisive for direct biases greater than 1 V. The second one is responsible for the linear dependence of the reverse circuits of the I-V, and also, starting from some temperatures (T > 294 K), plays a decisive role for the forward circuits at V < 1 B. In addition, there is a region where the direct current branches are described by the Child-Langmuir law (the current is limited by the space charge in the ballistic regime): T < 294 K, V < 1 B. Based on the approximation of experimental data by theoretical models, the value of series and shunt resistance at different temperatures was estimated as: Rs = 40 ÷70 kOhm, Rsh = 0.1÷7.6 mOhm.

Vlad H.I.

THE USE OF STATISTICAL AND MATHEMATICAL METHODS IN PHARMACY

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Introduction. Statistical and mathematical methods play a crucial role in the pharmaceutical industry for optimizing the research of medicinal products, producing high-quality products, and ensuring patient safety. They are used for the analysis of clinical data, quality control, drug efficacy prediction, and production process optimization, assisting pharmacists in making informed decisions at every stage of drug development and implementation.

The aim of the study. An exact usage of statistical and mathematical methods in pharmacy.

Material and methods. In the field of pharmacy, statistical and mathematical methods are applied to achieve several important objectives: Conducting clinical trials of medicinal products, including assessing their safety and effectiveness. Quality control of raw materials and finished pharmaceutical products. Predicting product stability and shelf life using mathematical models. Optimizing the production of pharmaceuticals through mathematical algorithms. Analyzing the interaction of drugs with other factors, including food, using statistical methods. Modeling pharmacokinetics and pharmacodynamics to understand drug processing in the body and their effects on biological systems. Predicting and analyzing the side effects of drugs using statistical methods. Analyzing market trends and demand for pharmaceutical products to develop marketing strategies.

Results. The application of these methods significantly contributes to achieving high product quality and production efficiency in the pharmaceutical industry. Therefore, statistical and mathematical methods are an integral part of pharmaceutical practice, helping to develop safe and effective medicines and maintain high production quality. The implementation of most of these methods can be done using MS Excel: AVERAGE Function (Mean value): Example: Analyzing the average treatment duration for a group of patients during clinical trials. It allows determining the average treatment duration and comparing it between different groups.

STDEV Function (Standard Deviation): Example: Calculating the standard deviation for the results of laboratory measurements of a pharmaceutical product's quality. It helps to assess data dispersion and product stability. COUNTIF Function (Calculation by condition): Example: Determining the number of patients meeting specific effectiveness criteria for a drug based on the analysis of clinical data. CORREL Function (Correlation): Example: Determining the correlation between drug intake and changes in biological indicators in patients during clinical trials. It helps to establish whether there is a correlation between treatment and patient improvement.

Conclusion. These are just four of the most important, from an objective perspective, functions of pharmaceutical statistics that are widely used for processing large amounts of data.