

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
ВИЩИЙ ДЕРЖАВНИЙ НАВЧАЛЬНИЙ ЗАКЛАД УКРАЇНИ
«БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»**



МАТЕРІАЛИ

101 – ї

підсумкової наукової конференції

професорсько-викладацького персоналу

Вищого державного навчального закладу України

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Матеріали 101 – ї підсумкової наукової конференції професорсько-викладацького персоналу вищого державного навчального закладу України «Буковинський державний медичний університет» (м. Чернівці, 10, 12, 17 лютого 2020 р.) – Чернівці: Медуніверситет, 2020. – 488 с. іл.

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У збірнику представлені матеріали 101 – ї підсумкової наукової конференції професорсько-викладацького персоналу вищого державного навчального закладу України «Буковинський державний медичний університет» (м.Чернівці, 10, 12, 17 лютого 2020 р.) із стилістикою та орфографією у авторській редакції. Публікації присвячені актуальним проблемам фундаментальної, теоретичної та клінічної медицини.

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arises in calculations of the kinetic parameters performed for the low ionic strength solutions without consideration of the migration of electroactive components.

The results of this work can be extended to any ions electroreduction processes governed by the first single-electron transfer stage.

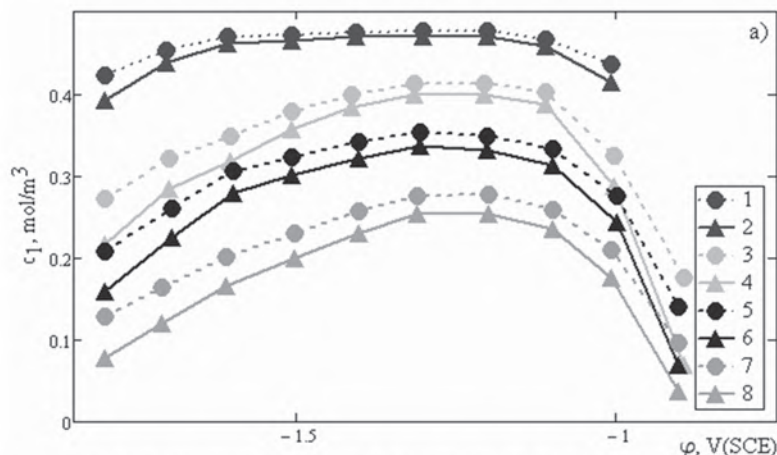


Figure. Dependencies of the concentration profiles for persulfate ions near the electrode surface ($c_{i,s}(5\lambda)$) according to the Levich's approach (solid line) and for all three contributions into transportation of ions taken into account (dotted line) on the electrode potential. Lines correspond to the following NaF concentration, mol/m³: (1,2) – 19; (3,4) – 14; (5,6) – 9; (7,8) – 4.

Okrepka G.M.

MATHEMATICAL PLANNING OF THE QUANTUM DOTS SYNTHESIS

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AgInS₂, as one of ternary I-III-VI₂ quantum dots (QDs), are promising due to their size and composition dependent optical properties. The aim of this work is to reveal and describe the interrelation between the studied in wide range precursor initial content ratio and AgInS₂ QDs optical properties. For this purpose, we have applied simplex design experiment planning approach according to the Scheffe plan. Such mathematical tool is usually used to determine the optimum combination of multicomponent system chemical constituents that provides a desire property using a minimum number of experimental runs. This approach also enables the number of experiments to be decreased to substantially reduce the time for the investigations.

Ag-In-S/ZnS quantum dots were synthesized in water solution. Spectral properties of QDs have been investigated by the photoluminescence and absorption spectroscopies. Depends on the ratio of the concentration of initial components AgInS₂ QDs with different optical properties were synthesized. Coordinates of concentrate triangle ABC for the synthesis of AgInS₂ nanoparticles were: A- Ag-rich (25AgNO₃ + 50InCl₃ + 25Na₂S), B-S-rich (10AgNO₃ + 50InCl₃ + 40Na₂S), C- In rich (10AgNO₃ + 80InCl₃ + 10Na₂S). The composition of 15 experimental points pertinent to the triangle ABC according to the Scheffe plan and corresponding λ_{exp} values of the PL peak position of the colloidal AgInS₂ solution are shown as Table.

2D representation of PL-maximum dependence of AgInS₂ QDs on the composition of reaction mixture are constructed as triangle with isolines with the same value of the wavelength of PL peak position. Total theoretical equation for the experimental data can be expressed as:

$$y = 617x_1 + 671x_2 + 603x_3 + 68x_1x_2 + 0x_1x_3 - 72x_2x_3 + 144x_1x_2(x_1 - x_2) + 69x_1x_3(x_1 - x_3) - 58,6x_2x_3(x_2 - x_3) + 112(x_1 - x_2)^2x_1x_2 + 85(x_1 - x_3)^2x_1x_3 + 64(x_2 - x_3)^2x_2x_3 - 1056x_1^2x_2x_3 - 10,7x_1x_2^2x_3 + 688x_1x_2x_3^2$$



Using 2D diagram and this equation we can theoretically predict PL properties of the AgInS₂ QDs and we can choose the composition of reaction mixture and synthesize Ag-In-S/ZnS quantum dots with estimated peak position.

Table

The composition of 15 reaction mixtures of triangle ABC for the synthesis of Ag-In-S nanoparticles and corresponding λ_{exp} values of the PL peak position

| Sample number | Percent composition, % | | | Volume, ml | | | λ_{exp} |
|---------------|------------------------|------|------|-------------------|-------------------|-------------------|-----------------|
| | x2 | x3 | x1 | AgNO ₃ | InCl ₃ | Na ₂ S | |
| 1 | 1 | 0 | 0 | 0,675 | 1,350 | 0,675 | 672 |
| 2 | 0,75 | 0 | 0,25 | 0,574 | 1,552 | 0,573 | 677 |
| 3 | 0,5 | 0 | 0,5 | 0,472 | 1,755 | 0,472 | 650 |
| 4 | 0,25 | 0 | 0,75 | 0,371 | 1,957 | 0,371 | 637 |
| 5 | 0 | 0 | 1 | 0,270 | 2,160 | 0,270 | 742 |
| 6 | 0 | 0,25 | 0,75 | 0,270 | 1,957 | 0,472 | 596 |
| 7 | 0 | 0,5 | 0,5 | 0,270 | 1,755 | 0,675 | 600 |
| 8 | 0 | 0,75 | 0,25 | 0,270 | 1,552 | 0,877 | 582 |
| 9 | 0 | 1 | 0 | 0,270 | 1,350 | 1,080 | 597 |
| 10 | 0,25 | 0,75 | 0 | 0,371 | 1,350 | 0,978 | 613 |
| 11 | 0,5 | 0,5 | 0 | 0,472 | 1,350 | 0,877 | 624 |
| 12 | 0,75 | 0,25 | 0 | 0,573 | 1,350 | 0,776 | 639 |
| 13 | 0,5 | 0,25 | 0,25 | 0,472 | 1,552 | 0,675 | 628 |
| 14 | 0,25 | 0,25 | 0,5 | 0,371 | 1,755 | 0,573 | 612 |
| 15 | 0,25 | 0,5 | 0,25 | 0,371 | 1,552 | 0,776 | 612 |

Velyka A. Ya

OXIDATIVE MODIFICATION OF PROTEINS UNDER WATER AND SALT STRESS ASSOCIATED WITH THE HgCl₂ NEPHROPATHY

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Mercury chloride is a xenobiotic with a wide range of toxicity which affects various organs and systems, but the kidney is among those suffering the most of this kind of intoxication. That is why it is important to carry out wide investigations of its toxicity mechanism, effect on different organs and tissues, and changes caused by this toxic agent alone or in combination with other aggravating or mitigating conditions.

The kidney is a vital organ of human and animals, which is responsible for maintenance of the water-electrolyte balance, acid-base and osmotic homeostasis. This organ is capable of providing highly selective excretion of water and various ions to maintain the stable content of the internal biological liquids. There is a dynamic balance between pro- and antioxidants in the tissues and organs of living organism, which can be disturbed by oxidative stresses and shifted towards more active formation of the free radicals. They contribute to oxidation of the macromolecules resulting in some disorders in the cell membranes structure and functioning.

Our experiments were conducted on white nonlinear male adult rats with weight 180±10 g. The animals were kept in the vivarium at stable temperature and illumination and subdivided into eight groups. The water and salt stress were delivered via the metal endogastric probe 2 hours before euthanasia. The euthanasia was realized by decapitation under brief ether narcosis according to the European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes (ETC 123). The kidneys were taken out of the decapitated rats as soon as possible, dried by the filter paper and separated into three parts: cortex, medullar and papilla. Then the 5 % supernatant solution was prepared from renal tissue using the 50 mM tris-HCl buffer solution (pH=7.4) containing 0.1 % solution of Trilon B by centrifugation at 900 g for 10 min. All these operations were performed at the temperature below 4 °C. Afterwards, the free radical oxidation conditions for lipids and proteins were determined in the post-nuclear supernatants by the content of TBA-RP and the oxide-modified proteins products (OMP-P). The R/B coefficient