This work covers the effectiveness of the White tea extract as a green corrosion inhibitor and is correlated to the strength and stability bonding between the phenolic molecule and the Fe atoms in mild steel and how this interaction can be studied by altering the concentration and temperature. White tea has received considerable attention due to its capability as a corrosion inhibitor and has been extensively studied using electrochemical techniques. However, accurate and systematic functional group identification and surface modification have been missing. Our study sought to demonstrate the quantitative measurement of electrochemical impedance spectroscopy (EIS) complemented by the FTIR (Fourier transform infrared spectroscopy), Total Phenolic Test, and Raman Spectroscopy. The SEM (Scanning Electronic Microscope)/EDX (Energy-Dispersive X-Ray Spectroscopy), and AFM (Atomic Force Microscope) were used to study the surface modification. The EIS results show that the optimum inhibition efficiency was 96 % in a solution of 80 ppm at 60 °C. Acetone 70 % was used to extract White tea and gives 14.17±0.25 % phenolic compound. Spectroscopic studies show -OH, Aromatic C=C, C=O and C-O-C become major contributors in the adsorption process and are found on the surface of metals as corrosion protection. Meanwhile, the thermodynamic calculation shows the White tea was adsorbed chemically. The nearness of R² to 1 shows the adsorption agrees with the Langmuir adsorption isotherm. Eventually, the surface modification revealed that phenol molecules are responsible to reduce the corrosion rate at 16.38×10⁻³ mpy. Our results are expected to provide a guideline for future research in White tea as a green corrosion inhibitor.

**Keywords**: catechin, green corrosion inhibitor, chemisorption, adsorption, surface modification, Langmuir isotherm.

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DEVELOPMENT OF COALESCENTS FOR PAINTS AND VARNISHES BASED ON IONIC LIQUIDS – THE PRODUCTS OF DIETHANOLAMINE AND INORGANIC ACIDS INTERACTION (p. 21–29)

Yevhenii Levchenko
SHEI «Ukrainian State University of Chemical Technology», Dnipro, Ukraine
ORCiD: https://orcid.org/0000-0001-9112-1112

Olga Sverdlkovska
SHEI «Ukrainian State University of Chemical Technology», Dnipro, Ukraine
ORCiD: https://orcid.org/0000-0001-7404-5509

Denys Chervakov
SHEI «Ukrainian State University of Chemical Technology», Dnipro, Ukraine
ORCiD: https://orcid.org/0000-0003-1521-9171

Oleh Chervakov
SHEI «Ukrainian State University of Chemical Technology», Dnipro, Ukraine
ORCiD: https://orcid.org/0000-0002-1631-3592

This paper reports the synthesis of ionic liquids through the interaction between diethanolamine and orthophosphate and boric acids in order to establish the possibility of replacing volatile coalescents in a formulation for paints and varnishes with ionogenic compounds. The results from studying the influence of polymeric coalescents based on ionic liquids on the rheological properties of water-dispersion paints and varnishes of different nature are presented. It has been established that the synthesized coalescents can be used to modify the properties of paints and varnishes based on polyurethane and styrene-acrylic aqueous dispersions. It has been shown that the product of the interaction between diethanolamine and boric acid in aqueous solutions forms an ionogenic complex compound with a unipolar conductivity in terms of OH ions. It was also established that when introduced to the formulation of water-dispersion paints and varnishes, the solutions of modifiers produce a diluting action. The influence of ionic liquids on the process of film formation of aqueous dispersions of polymers and pigmented paints and varnishes based on them was investigated. It was established that the synthesized ionogenic compounds are not inferior, in terms of their effective-ness, to the widespread conventional industrial coalescents of the Texanol® type.

Therefore, there is reason to assert the possibility of replacing the industrial coalescent Texanol® in the formulation of pigmented water-dispersion paints and varnishes based on styrene-acrylic and polyurethane dispersions with fundamentally new synthesized ionogenic modifiers. Thus, the coatings with a coalescent based on ion liquid of diethanolamine borate have a higher level of conditional hardness, which exceeds by 17 % the hardness index of the paint made on the basis of the conventional Texanol® type coalescent, without changing its decorative properties, such as color and shine.

Keywords: ionic liquid, diethanolamine, boric acid, orthophosphate acid, coalescent, paints and varnishes.

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DIRECTION TOWARDS CONDENSATE OIL FROM DURING ANALYSIS OF COOLING WATER TRANSFER, DIRECTION TOWARDS CONDENSATE OIL FROM SCRAP TIRES (p. 30–37)

**Budhi M Suyitno**
Universitas Pancasila, South Jakarta, DKI Jakarta, Indonesia
ORCID: https://orcid.org/0000-0003-4386-0352

**Erlanda Augupta Pane**
Universitas Pancasila, South Jakarta, DKI Jakarta, Indonesia
ORCID: https://orcid.org/0000-0002-3534-3821

**Wina Libyawati**
Universitas Pancasila, South Jakarta, DKI Jakarta, Indonesia
ORCID: https://orcid.org/0000-0001-6593-0594

**Chatrine Jelita**
Universitas Pancasila, South Jakarta, DKI Jakarta, Indonesia
ORCID: https://orcid.org/0000-0003-2213-5734

**Hendri Sukma**
Universitas Pancasila, South Jakarta, DKI Jakarta, Indonesia
ORCID: https://orcid.org/0000-0002-3994-9822

**Ismail**
Universitas Pancasila, South Jakarta, DKI Jakarta, Indonesia
ORCID: https://orcid.org/0000-0001-7911-4163

The application of pyrolysis for the thermal decomposition of tire waste can be taken as the ideal concept to reduce and recycle tire waste. The product of the process can produce condensate oil, a typical oil that is close to crude oil properties. The critical aspect of the pyrolysis process is the design of the reactor, particularly for the condenser where the rate of heat transfer contributes to the overall quantity and quality of the produced condensate oil. This study focused on the effect of water flow direction on the condensation process of pyrolysis gas. The quantity and quality of the produced oil are examined to observe the effect of the condensation process. Two different water flow directions are tested in the process, namely, counter flow and parallel flow direction. The effect of water flow direction in the condenser clearly affects the pyrolysis process to produce the condensate oil. Based on the production quantity, the counter flow condenser is able to produce 355 ml of condensate oil while the parallel flow one merely 290 ml. Based on the quality of the produced condensate oil, the counter flow condenser is generally better than the parallel flow one where the density, flash point and viscosity are close to crude oil properties. The rate of heat transfer from the condenser to the pyrolysis gas is the main factor that contributes to the quality and quantity of the condensate oil. The average heat transfer for the counter and parallel flow is 2,728 W and 1,865 W, respectively. It can be said that using the counter flow condenser for the pyrolysis reactor can improve the quality and quantity of the condensate oil.

**Keywords**: counter flow, parallel flow, pyrolysis, condenser, heat transfer.

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Obtaining such substances-platforms as, in particular, 5-hydroxymethylfurfural is one of the areas most actively investigated at present. They can act as raw materials for the further production of a new generation of biopolymers, fuels, pharmaceuticals, dietary supplements, and other chemicals. This paper reports the catalysts, synthesized by using methods of ion exchange and impregnation, based on the large-pore zeolites X, Y, and M, which contain the cations of rubidium, lanthanum, calcium, and ammonium. It was found that the zeolites’ specific surface area was 400–500 m²/g; the selected synthesis conditions did not cause noticeable destruction of the microporous structure. In the presence of the synthesized catalysts, glucose dehydration in the aqueous medium and in dimethyl sulfoxide was carried out at 150–160 °C. The higher efficiency of polycrystalline forms of zeolites in a non-aqueous medium has been established. In the latter case, a 40 % yield of 5-hydroxymethylfurfural was achieved at an almost complete glucose conversion. Deactivated catalyst samples were investigated using the methods of infrared spectroscopy and differential thermal analysis/thermogravimetry. It was found that the catalyst accumulates fewer oligomerization process by-products when the reaction is implemented in dimethyl sulfoxide. The loss of mass by the samples deactivated in an aqueous medium is 30–33 %, while in dimethyl sulfoxide – up to 24 %. The obtained results are important for practical application as the only volatile conversion product is 5-hydroxymethylfurfural with a yield of up to 40 %. That is acceptable for the possible implementation of a one-stage process of obtaining 5-hydroxymethylfurfural in the future.

**Keywords:** large-pore zeolites, polycrystalline forms, glucose dehydration, 5-hydroxymethylfurfural, yield, glucose conversion.

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**OBTAINING GLUCOSE-BASED 5-HYDROXYMETHYLFURFURAL ON LARGE-PORE ZEOLITES (p. 38-44)**

Lyubov Patrylyak
National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine

**ORCID:** http://orcid.org/0000-0002-8049-9811

Serhii Konovalov
V. P. Kukhar Institute of Bioorganic Chemistry and Petrochemistry NAS of Ukraine, Kyiv, Ukraine

**ORCID:** http://orcid.org/0000-0003-3533-8061

Olesandra Pertko
V. P. Kukhar Institute of Bioorganic Chemistry and Petrochemistry NAS of Ukraine, Kyiv, Ukraine

**ORCID:** http://orcid.org/0000-0003-3539-7688

Anzhela Yakovenko
V. P. Kukhar Institute of Bioorganic Chemistry and Petrochemistry NAS of Ukraine, Kyiv, Ukraine

**ORCID:** http://orcid.org/0000-0002-2212-0345

Volodimyr Povazhnyi
V. P. Kukhar Institute of Bioorganic Chemistry and Petrochemistry NAS of Ukraine, Kyiv, Ukraine

**ORCID:** http://orcid.org/0000-0002-0394-7035

Oleksandr Mehychuk
LLC «Fluid Management Systems», Kyiv, Ukraine

**ORCID:** http://orcid.org/0000-0002-6664-0006
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SYNTHESIS OF Ni(OH)2, SUITABLE FOR SUPERCAPACITOR APPLICATION, BY THE COLD TEMPLATE HOMOGENEOUS PRECIPITATION METHOD (p. 45–51)

Vadym Kovalenko
Ukrainian State University of Chemical Technology, Dnipro, Ukraine
Vyatka State University, Kirov, Russian Federation

ORCID: https://orcid.org/0000-0002-8012-6732

Valerii Kotok
Ukrainian State University of Chemical Technology, Dnipro, Ukraine
Vyatka State University, Kirov, Russian Federation

ORCID: https://orcid.org/0000-0001-8879-7189

α-Ni(OH)2 obtained by template homogeneous precipitation exhibits high electrochemical activity in supercapacitors. The main disadvantage is the high energy consumption for maintaining a high temperature during synthesis. To reduce energy consumption, it is proposed to lower the synthesis temperature. In the study, α-Ni(OH)2 was obtained by the method of cold template homogeneous precipitation using Culminal C8465 (0.5 %) as a template for 6 months at t=20–35 °С. The electrochemical characteristics of the sample were studied by cyclic voltammetry and galvanostatic charge-discharge cycling of a pasted binder-free electrode made without introducing an external binder in the supercapacitor mode. It was determined that low-crystalline α-Ni(OH)2 was formed, consisting of agglomerates of spherical particles. Low specific char-
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characteristics of nickel hydroxide were revealed at the beginning of cycling due to blocking of the active surface. It was shown that the specific capacity of the sample increased with further cycling due to the breakdown of aggregates into smaller particles; specific capacities of 80 F/g and 38 mA h/g were obtained. However, the lack of binding properties of the template residues was revealed, resulting in a decrease in specific characteristics. It was concluded that it was necessary to introduce an external binder. A previously undescribed effect of a significant increase in the specific capacity during drying of an alkali-impregnated electrode caused by the disintegration of particle agglomerates during alkali carbonization (the maximum capacity is 153 F/g and 69 mA h/g) was revealed. It was concluded that using the revealed effect of any nickel hydroxide samples obtained by various methods of bulk template synthesis was promising.

Keywords: nickel hydroxide, template synthesis, cold homogeneous precipitation, supercapacitor.

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DEFINING PATTERNS IN THE INFLUENCE EXERTED BY THE INTERRELATED BIOCHEMICAL CORROSION ON CONCRETE BUILDING STRUCTURES UNDER THE CONDITIONS OF A CHEMICAL ENTERPRISE (p. 52–60)

Oksana Shkromada
Sunny National Agrarian University, Sunny, Ukraine
ORCID: https://orcid.org/0000-0003-1751-7009

Viktoriia Ivchenko
Sunny National Agrarian University, Sunny, Ukraine
ORCID: https://orcid.org/0000-0002-5985-9712

Vadym Chivanov
Institute of Applied Physics, National Academy of Sciences of Ukraine, Sunny, Ukraine
ORCID: https://orcid.org/0000-0001-5845-2315

Liudmyla Tsyhanenko
Sunny National Agrarian University, Sunny, Ukraine
ORCID: https://orcid.org/0000-0002-6628-3635

Hennadi Tsyhanenko
Sunny National Agrarian University, Sunny, Ukraine
ORCID: https://orcid.org/0000-0002-3335-4804

Volodymir Moskalenko
Institute of Applied Physics, National Academy of Sciences of Ukraine, Sunny, Ukraine
ORCID: https://orcid.org/0000-0003-2775-1317

Iryna Kyrechata
Kharkiv National Automobile and Highway University, Kharkiv, Ukraine
ORCID: https://orcid.org/0000-0002-0270-1586

Olena Shershheniuk
Kharkiv National Automobile and Highway University, Kharkiv, Ukraine
ORCID: https://orcid.org/0000-0002-9959-2725

Yulia Litman
Sunny State University, Sunny, Ukraine
ORCID: https://orcid.org/0000-0001-5748-2213

The effect of microbial and chemical corrosion on concrete structures operated in the conditions of chemical enterprises has been established that makes it possible to reliably predict the timing of their decommissioning in order to prevent industrial disasters. Even though the construction complies with all building codes, concrete structures eventually undergo chemical and biological corrosion.

The innovation proposed in this study implies investigating the depth and degree of damage to concrete at the microscopic level by the method of raster electron microscopy. In addition, the TPD-MS method has been suggested for determining the quantitative and qualitative state of the carbonate components of concrete and sulfur compounds.

This study has found that in concrete samples from the titanium dioxide production plant, the amount of carbon dioxide release is twice less than in control samples at t=600 °C while the level of sulfur dioxide, on the contrary, increases. This is due to the ability of thionic bacteria to accumulate sulfate acid that destroys the cementing component in concrete. The reported results confirm the impact of products of the activity of Acidithiobacillus thiooxidans microorganisms on corrosion processes in concrete.

In addition, when using the TPD-MS method, it was established in the storage room of the finished product that heating the control sample of concrete leads to a release of the significant amount of CO₂ at t=580–600 °C. However, the experimental samples of concrete are almost lacking carbon compounds because the acid metabolites of microfungi interfere with its formation. Microscopic and REM studies revealed the localization of Acidithiobacillus thiooxidans and Aspergillus fumigatus in concrete.

This study has established patterns related to the mechanism that forms chemical compounds in concrete and the metabolism of microorganisms.

Keywords: biochemical corrosion of concrete, sulfate acid, Thio- bacillus thiooxidans bacterium, Aspergillus fumigatus micromycetes.

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AN INVESTIGATION OF THE EFFECT OF THERMOPLASTIC ADDITIVES IN ASPHALT CONCRETE MIXTURES ON THE PROPERTIES OF DIFFERENT TYPES OF ASPHALT CONCRETE (p. 61–70)

Valeriy Zhdaniuk
Kharkiv National Automobile and Highway University, Kharkiv, Ukraine

ORCID: https://orcid.org/0000-0003-0420-7036

Oleksandr Volovyk
Kharkiv National Automobile and Highway University, Kharkiv, Ukraine

ORCID: https://orcid.org/0000-0002-9949-3767

Dmytro Kostin
Kharkiv National Automobile and Highway University, Kharkiv, Ukraine

ORCID: https://orcid.org/0000-0002-4278-2990

Sergey Lisovin
LLC Road Innovation Company, Kharkiv, Ukraine

ORCID: https://orcid.org/0000-0002-5252-8197
Abstract and References. Technology organic and inorganic substances

The effect of modification of asphalt concrete mixtures of different grain sizes with “Ric-PolyCell” (Ukraine) and “Duroflex®-SMA” thermoplastic polymers (Germany), which were added directly to the asphalt mixer during their preparation, on the properties of asphalt concrete was studied. It is confirmed that it is more expedient to use stone mastic asphalt concretes with a larger size of mineral crushed stone grains on high-traffic roads, as they are more rutting-resistant compared to asphalt concretes with smaller size and content of crushed stone grains.

The effect of the temperature of preparation and thermostating of asphalt concrete mixtures modified with the investigated thermoplastics on the compressive strength of asphalt concrete at a temperature of 50 °C, which were made of the studied mixtures, was investigated. It was found that the maximum possible temperatures of preparation and thermostating of asphalt concrete mixes provide a more complete modification.

The effect of the content of thermoplastic polymers in the composition of asphalt concrete mixtures on the properties and rutting resistance of fine-grained asphalt concrete, as well as stone mastic asphalt concrete, was studied. It was found that adding the “Ric-PolyCell” polymer in the amount of 1.5 % and 3 % by weight of bitumen in the composition of the studied asphalt mixtures in the asphalt mixer during their preparation increases the rutting resistance of asphalt concrete under the studied conditions by 2.52–3.86 times. Modification of asphalt concrete mixtures with the “Duroflex®-SMA” additive in the amount of 0.3 % and 0.6 % by weight of the aggregate by a similar technology also allows increasing the rutting resistance of the obtained asphalt concrete by 1.86–3.16 times. Using these modifiers in the future will have a positive effect on the service life of the entire pavement structure.

Keywords: fine-grained asphalt concrete, stone mastic asphalt concrete, bitumen, asphalt concrete mixture, thermoplastic polymer, asphalt mixer, plastic deformations, rutting resistance.

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Розробка екстракту білого чаю в якості зеленого інгібітора корозії в м'якій сталі в 1 М розчині соляної кислоти (с. 6–20)

Agus Paul Setiawan Kaban, Aga Rizhova, Gadang Priyotomo, Bema Elya, Ahmad Maksum, Yunita Sadeli, Sutopo, Taufik Aditiyawarman, Rini Riastuti, Johny Wahyuadi Soedarsono

У даній роботі розглядається ефективність екстракту білого чаю в якості зеленого інгібітора корозії, а також міцність і стабільність зв'язку між молекулою фенолу і атомами Fe в м'якій сталі і як ця взаємодія може бути вивчена шляхом зміни концентрації і температури. Білий чай отримав значну увагу завдяки своїй здатності інгібувати корозію і був широко вивчений з використанням електрохімічних методів. Однак точна і систематична ідентифікація функціональних груп і модифікація поверхні були відсутні. Представлене дослідження було спрямоване на демонстрацію кількісного вимірювання електрохімічної імпедансної спектроскопії (ЕІС), доповнено Фур'є-ІЧС (Фур'є-ІЧ-спектроскопія), вимірюванням концентрації загальних фенолів і Раманівською спектроскопією. Для дослідження модифікації поверхні використовували СЕМ (скануючий електронний мікроскоп)/ЕРС (енергодисперсійна рентгенівська спектроскопія) і АСМ (атомно-силовий мікроскоп). Результати ЕІС показують, що оптимальна ефективність інгібування склала 96 % в розчині 80 ppm при 60 °C. Ацетон 70 % використовували для екстракції білого чаю і отримували 14,17±0,25 % фенольну сполуку. Спектроскопічні дослідження показують, що -OH, ароматичні C=C, C=O і C-O-C стають основними учасниками процесу адсорбції і виявляються на поверхні металів в якості захисту від корозії. Тим часом термодинамічний розрахунок показує, що білий чай був адсорбований хімічно. Близькість R² до 1 показує, що адсорбція узгоджується з ізотермою адсорбції Ленгмюра. В кінцевому підсумку модифікація поверхні показала, що молекули фенолу відповідають за зниження швидкості корозії до 16.38 × 10⁻³ mpy. Очікується, що представлені результати послугуватимуть керівництвом для майбутніх досліджень білого чаю в якості зеленого інгібітора корозії.

Ключові слова: катехін, зелений інгібітор корозії, хемосорбція, адсорбція, модифікація поверхні, ізотерма Ленгмюра.

Розробка коалесцентів для лакофарбових матеріалів на основі іонних рідин – продуктів взаємодії діетаноламіну з неорганічними кислотами (с. 21–29)

Є. П. Левченко, О. С. Свердліковська, Д. О. Черваков, О. В. Черваков

Синтезовано іонні рідини шляхом взаємодії діетаноламіну з ортофосфатною та борною кислотами для встановлення можливості заміни летких коалесцентів у складі лакофарбових матеріалів на іоногенні сполуки. Представлено результати дослідження впливу полімерних коалесцентів на основі іонних рідин на реологічні властивості воднодисперсійних лакофарбових матеріалів різної природи. Встановлено, що синтезовані коалесценти можна використовувати для модифікації властивостей лакофарбових матеріалів на основі поліуретанових та стирол-акрилових водних дисперсій. Показано, що продукт взаємодії діетаноламіну та борної кислоти у водних розчинах утворює іоногенну комплексну сполуку з уніполярною провідністю за іонами ОН⁻. Також встановлено, що при введенні до складу воднодисперсійних лакофарбових матеріалів розчини модифікаторів чинять розріджувану дію. Проведено дослідження впливу іонних рідин на процес плівкоутворення водних дисперсій полімерів та пігментованих лакофарбових матеріалів на їх основі. Встановлено, що синтезовані іоногенні сполуки не поступаються за своєю ефективністю широко розповсюдженим традиційним промисловим коалесцентам типу Texanol®. Таким чином, є підстави стверджувати про можливість заміни промислового коалесценту Texanol® у складі пігментованих водних дисперсій на принципово нові синтезовані іоногенні коалесценти. Так, покриття з коалесцентом на основі іонної рідини діетаноламіну та борної кислоти мають більш високий рівень умовної твердості, яка перевищує на 17 % показник твердості фарби, виготовленої на основі традиційного коалесценту типу Texanol®, не змінюючи її декоративні властивості, такі як колір та блиск.

Ключові слова: іонна рідина, діетаноламін, борна кислота, ортофосфатна кислота, коалесцент, лакофарбові матеріали.

Аналіз впливу напряму потоку охолоджуючої води на конденсатне масло з відпрацьованих шин (с. 30–37)

Budhi M Suyitno, Erlanda Augupta Pane, Wina Libyawati, Chatrine Jelita, Hendri Sukma, Ismail Suyitno

Застосування піролізу для термічного розкладання відпрацьованих шин можна розглядати як ідеальну концепцію для скорочення їх кількості і переробки. В результаті цього процесу може утворюватися конденсатне масло, типове масло, близьке за властивостями до сирої нафти. Критичним аспектом процесу піролізу є конструкція реактора, особливо для конденсатора, де швидкість теплопе
Однородный гомогенный осаджени c Ni(OH)2, полученный методом холодного темплатного гомогенного осаджения.

В. Л. Коваленко, В. А. Поважный, О. В. Мельничук

ОБЕЩЕНИЯ РОССИИ ОБЕЩАЕТСЯ РЕАЛИЗОВАТЬ ОСАДЖЕНИЯ НА ОСНОВЕ ГЛЮКОЗЫ НА ШИРОКОПОРИСТИХ ЦЕОЛИТАХ (с. 38–44)

Л. К. Патриляк, С. В. Коновалов, О. П. Перкто, А. В. Яковенко, В. А. Поважный, О. В. Мельничук

Определить, что в соединении с гидроксидом никеля, темплатный синтез, холодное гомогенное осаждение, суперконденсатор.

Ключевые слова: \( \alpha \)-Ni(OH)\(_2\), \( \alpha \)-Ni(OH)\(_2\) гидроксид никеля, темплатный синтез, холодное гомогенное осаждение, суперконденсатор.

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ОДЕРЖАННЯ 5-ГІДРОКСИМЕТИЛФУРФУРУЛОВУ НА ОСНОВІ ГЛЮКОЗИ НА ШИРОКОПОРИСТИХ ЦЕОЛИТАХ (с. 38–44)

Л. К. Патриляк, С. В. Коновалов, О. П. Перкто, А. В. Яковенко, В. А. Поважный, О. В. Мельничук

Однородный речёвник-платформа, синтез, 5-гидроксиметилфуфуролу, одном из направлений, что наиболее активно расширяется на сегодня. Они могут быть использованы для холодного осаждения нового поколения биополимеров, линий, фармацевтических препаратов, хранящих добавок, и других химических речёвников. Синтезирован катализаторы на основе широкопористых цеолитов \( \alpha \) и \( \beta \) методами внутреннего обмена и просачивания, что вызывает катионную диффузию, кальций и аммоний. Знайдено, что пиковая поверхность цеолитов составляет 200–500 м\(^2\)/г, а выбранное увлажнение не снижает вязкого действенного микропористой структуры. \( \alpha \) и \( \beta \) методами внутреннего обмена проведено дегидратацию глюкозы в водном растворе, и в диэтиловом эфире за 150–160 °C. За допомогою газовой хроматографии проанализировано продукты реакции, разработано виход 5-гидроксиметилфуфуролу, а также глюкозы. Встановлено вишу эффективность поликатионных форм цеолитов в водном растворе. В останнем виходе до 40 % выходит 5-гидроксиметилфуфуролу за фактически полной конверсии глюкозы. Методами инфракрасно-спектроскопии и рентгенографического анализа при использовании дезактивированных катализаторов. Встановлено, что в задачи реакции в диэтиловом эфире катализаторы могут накапливаться продукты побочных процессов экстракции. Врача мыши зрачков, дезактивированных в водном растворе, включая 30–33 %, так же в диэтиловом эфире – до 24 %. Одержані результати є практично важливими, оскільки єдиним легким продуктом перероблення є 5-гидроксиметилфуфурол з вихід до 40 %. Останні є прийнятні для можливої майбутньої реалізації одноствадійного процесу одержання 5-гидроксиметилфуфуролу.

Ключевые слова: цеолиты широкопористые, формы поликатионные, глюкозы, дегидратация, 5-гидроксиметилфуфурол, вихід, конверсия глюкозы.

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СИНТЕЗ \( \text{Ni(OH)}_2 \), ПРИГОДНОГО ДЛЯ ПРИМЕНЕНИЯ В СУПЕРКОНДЕНСАТОРАХ, МЕТОДОМ ХОЛОДНОГО ГОМОГЕННОГО ТЕМПЛАТНОГО ОСАЖДЕНИЯ (с. 45–51)

В. Л. Коваленко, В. А. Коток

Високоэффективные активности в суперконденсаторах проявляют \( \text{Ni(OH)}_2 \), отражающих действие темплатным гомогенным осаждения. Основной недостаток – високие значения энергии для поддержания высоких температур при синтезе. Для снижения энергопотребления необходимо снижение температуры синтеза. Соответственно, образовавшийся \( \text{Ni(OH)}_2 \), который включает в себя агрегатов, агрегатов сферической формы. Выведено низкой питомой концентрации гидроксида натрия по початку циклования через блокировку активной поверхности. Показано, что пиковая поверхность гидроксида натрия повышается при подактивном циклования за счет увеличения плотности агрегатов на близке дробной части, отмечено, что питомой концентрации 80 % и 38 мАгод/г. Однако выявлено недостаточность затрат питомой концентрации гидроксида натрия, в результате чего происходит снижение питомых характеристик. Зроблено висновок щодо необхідності введення зовнішнього зв'язку.

Ключевые слова: гидроксид натрия, темплатный синтез, холодное гомогенное осаждение, суперконденсатор.
ВИЗНАЧЕННЯ ЗАКОНОМІРНОСТЕЙ ВПЛИВУ ВЗАЄМОПОВ’ЯЗАНОЇ БІОХІМІЧНОЇ КОРОЗІЇ НА БЕТОННІ БУДІВЕЛЬНІ КОНСТРУКЦІЇ В УМОВАХ ХІМІЧНОГО ПІДПРИЄМСТВА (с. 52–60)

О. І. Шкромада, В. Д. Івченко, В. Д. Чіванов, Л. А. Циганенко, Г. М. Циганенко, В. Б. Москаленко, І. М. Кирчата, О. М. Шершенюк. Ю. В. Ліцман

Встановлено вплив мікробної та хімічної корозії на бетонні споруди, що експлуатуються в умовах хімічних підприємств, з метою надійного прогнозування термінів виведення останніх із функціонування для попередження виробничих катастроф. Незважаючи на те, що будівництво велось із урахуванням всіх будівельних норм, бетонні конструкції з часом піддаються хімічній та біологічній корозії.

Запропоновано як новацію дослідження глибини та ступеню пошкодження бетону на мікроскопічному рівні метод растрової електронної мікроскопії. Крім того, для визначення кількісного та якісного стану карбонатних складових бетону та сполук сірки за-пропоновано метод TPD-MS.

Дослідженнями встановлено, що в зразках бетону в цеху з виробництва діоксиду титану кількість виділення двоокису вуглецю в два рази менше, ніж у контрольних зразках при t = 600 °С, а рівень двоокису сірки навпаки відповідно зростає. Це пов’язано із здатністю тіонових бактерій накопичувати сульфатну кислоту, яка руйнує цементуючі складові у бетоні. Отримані результати підтверджують вплив продуктів життедіяльності мікроорганізмів Acidithiobacillus thiooxidans на корозійні процеси у бетоні.

Крім того, методом TPD-MS у приміщені зберігання готової продукції встановлено, що при нагріванні контрольного зразка бетону виділяється значна кількість СО₂ при t = 580–600 °С. Однак у дослідних зразках бетону сполуки карбону практично відсутні через те, що кислотні метаболіти мікрогрибів перешкоджають його формуванню. Мікроскопічними та РЕМ дослідженнями виявлена локалізація в бетоні Acidithiobacillus thiooxidans та Aspergillus fumigatus.

Дослідженнями встановлені закономірності між механізмом утворення хімічних сполук в бетоні та метаболізмом мікроорганізмів.

Ключові слова: біохімічна корозія бетону, сульфатна кислота, бактерія Thiobacillus thiooxidans, мікроміцети Aspergillus fumigatus.

ДОСЛІДЖЕННЯ ВПЛИВУ ДОБАВОК ТЕРМОПЛАСТИВ ДО АСФАЛЬТОБЕТОННИХ СУМІШЕЙ НА ВЛАСТИВОСТІ АСФАЛЬТОБЕТОНІВ РІЗНИХ ТИПІВ ТА ВИДІВ (61–70)

В. К. Жданюк, О. О. Воловик, Д. Ю. Костін, С. В. Лісовін

Виконані дослідження впливу модифікації асфальтобетонних сумішей різної гранулометрії термопластичними полімерами «Ric-PolyCell» (Україна) та «Duroflex®-SMA» (Німеччина), які додавали безпосередньо у асфальтозмішувач під час їх приготування, на властивості асфальтобетонів. Підтверджено, що більш доцільно на автомобільних дорогах з високою інтенсивністю руху великовогових транспортних засобів, використовувати щебенево-мастикові асфальтобетони з більшою крупністю мінеральних зерен щебеню, оскільки вони є більш колієстійкі, порівняно з асфальтобетонами з меншім розміром та вмістом зерен щебеню.

Досліджено вплив температури приготування та термостатування асфальтобетонних сумішей модифікованих досліджуваними термопластами на показник границі міцності при стиску асфальтобетонів за температури 50 °С, які були виготовлені з досліджуваних сумішей. Встановлено, що за максимально можливих температур приготування та термостатування асфальтобетонних сумішей відбувається більш повна їх модифікація.

Досліджено вплив вмісту термопластичних полімерів у складі асфальтобетонних сумішей на властивості та колієстійкість дрібнозернистого асфальтобетону, а також щебенево-мастикових асфальтобетонів. Встановлено, що додавання полімеру «Ric-PolyCell» у кількості 1,5 % та 3 % від маси бітуму до складу досліджених асфальтобетонних сумішей у асфальтомішувачі, під час їх приготування, дозволяє підвищити колієстійкість отриманих асфальтобетонів за досліджених умов від 2,52 до 3,86 разів. Модифікація асфальтобетонних сумішей добавкою «Duroflex®-SMA» у кількості 0,3 % та 0,6 % від маси мінеральної частини за аналогічною технологією, також дозволяє підвищити колієстійкість отриманих асфальтобетонів від 1,86 до 3,16 разів. Використання зазначених модифікаторів в подальшому позитивно впливатиме на збільшення терміну експлуатації усієї конструкції дорожнього одягу.

Ключові слова: дрібнозернистий асфальтобетон, щебенево-мастиковий асфальтобетон, бітум, асфальтобетонна суміш, термо-пластичний полімер, асфальтозмішувач, пластичні деформації, колієстійкість.