

УНИВЕРЗИТЕТ У БАЊОЈ ЛУЦИ
Технолошки факултет



ИЗВЈЕШТАЈ КОМИСИЈЕ
О ПРИЈАВЉЕНИМ КАНДИДАТИМА НА КОНКУРС ЗА ИЗБОР У ЗВАЊЕ
НАСТАВНИКА И САРАДНИКА ЗА УЖУ НАУЧНУ ОБЛАСТ

I ПОДАЦИ О КОНКУРСУ

Одлука о расписивању конкурса, орган и датум доношења одлуке:

Одлука Сената Универзитета у Бањој Луци, број: 01/04-3.2575/26 од 17.09.2026. године

Датум и мјесто објављивања конкурса:

30.09.2026. године, дневни лист "Глас Српске" и на интернет страници Универзитета у Бањој Луци

Назив факултета:

Технолошки факултет

Ужа научна област:

Хемијске технологије

Академско звање у које се кандидат бира:

Виши асистент

Број кандидата који се бирају

1 (један)

Број пријављених кандидата

1 (један)

САСТАВ КОМИСИЈЕ		
1	др Дијана Дрљача	ванредни професор
	Име и презиме	Звање
	Технолошки факултет, Универзитет у Бањој Луци	Хемијске технологије
	Установа у којој је запослен(а)	Ужа научна област
		ПРЕДСЈЕДНИК
		Функција у комисији
	др Татјана Ботић	редовни професор
	Име и презиме	Звање
	Технолошки факултет, Универзитет у Бањој Луци	Хемијске технологије
	Установа у којој је запослен(а)	Ужа научна област
3		ЧЛАН
		Функција у комисији
	др Драгана Кешељ	ванредни професор
	Име и презиме	Звање
	Технолошки факултет Зворник, Универзитет Источно Сарајево	Хемијске технологије
	Установа у којој је запослен(а)	Ужа научна област
		ЧЛАН
		Функција у комисији

	Пријављени кандидати
1	Дајана Драгић, ма

II БИОГРАФСКИ ПОДАЦИ О ПРИЈАВЉЕНИМ КАНДИДАТИМА

Први кандидат	
а) Основни биографски подаци:	
Дајана (Милорад и Љиља) Драгић	19.10.1994. године у Дрвару
Име (име оба родитеља) и презиме	Датум и мјесто рођења
Универзитет у Бањој Луци, Технолошки факултет	
Установе у којима је био запослен	
Универзитет у Бањој Луци	
Радна мјеста	
- Виши асистент: јун 2022 - данас (Одлука Сената и Уговор о раду у достављеном материјалу)	
- Асистент : октобар 2018 - јун 2022	
Чланство у научним и стручним организацијама или удружењима	
б) Дипломе и звања:	
Основне студије / студије I циклуса:	
Универзитет у Бањој Луци Технолошки факултет	Дипломирани инжењер хемијске технологије
Назив институције	Звање
Бања Лука, 09.03.2018.	9.67
Мјесто и година завршетка	Просјечна оцјена из цијелог студија
Постдипломске студије / студије II циклуса:	
Универзитет у Бањој Луци Технолошки факултет	Мастер хемијског инжењерства
Назив институције	Звање
Бања Лука, 2021. године	„Утицај брзине филтрације и температуре воде на процес нитрификације у поступку припреме воде за пиће“
Мјесто и година завршетка	Наслов завршног рада
Хемијско инжењерство	10.0
Научна област/умјетничка област	Просјечна оцјена
Докторат / студије III циклуса	
Назив институције	Мјесто и година одбране докторске дисертације
Назив докторске дисертације	

Научна област/умјетничка област
Универзитет у Бањој Луци, Технолошки факултет - асистент, 28.06.2018. Универзитет у Бањој Луци, Технолошки факултет - виши асистент, 24.03.2022.
Претходни избори у наставна и научна звања (институција, звања, година избора)

III ОБАВЕЗНИ УСЛОВИ

а) Наставни рад и доказане наставничке способности

Вредновање наставничких способности (Навести податке о спроведеном анкетирању студената, током цјелокупног претходног изборног периода уколико је исто спроведено или позитивну оцјену од стране високошколске установе)		
Академска година	Назив предмета	Оцјена
× 2024/2025	+ Квалитет воде, АГФ (вјежбе; анкетирано 5(6)) -	5
× 2022/2023	+ Квалитет воде, АГФ (вјежбе; анкетирано 5(5)) -	5
	+ Процесна техника, ТФ (вјежбе; анкетирано 9(10)) -	4.32
	+ Процесна техника, ТФ (лабораторијске вјежбе; анкетирано 9(10)) -	4.17
	+ Неорганске хемијске технологије, ТФ (лабораторијске вјежбе; анкетирано 11(12)) -	4.58
	+ Управљање чврстим и опасним отпадом, ТФ (лабораторијске вјежбе; анкетирано 10(12)) -	4.52
	+ Процесна техника, ТФ (вјежбе; анкетирано 13(13)) -	4.45
× 2021/2022	+ Процесна техника, ТФ (лабораторијске вјежбе; анкетирано 13(13)) -	4.48
	+ Инструменталне методе хемијске анализе, ТФ (лабораторијске вјежбе; анкетирано 14(14)) -	4.44
	+ Инжењерство у заштити околине, ТФ (лабораторијске вјежбе; анкетирано 16(18)) -	4.16
	+ Управљање чврстим и опасним отпадом, ТФ (лабораторијска вјежбе; анкетирано 16(18)) -	4.15
	+ Технологија воде, ТФ (лабораторијска вјежбе; анкетирано 13(14)) -	4.6
	+ Технологија неорганских материјала, ТФ (лабораторијска вјежбе; анкетирано 17(18)) -	4.42
	+ Малозагађујуће технологије и чистија производња, ТФ (лаб. вјежбе; анкетирано 17(18)) -	4.4
	+ Основе еколошког инжењерства, ТФ (лабораторијске вјежбе; анкетирано 9(11)) -	4.65
	+ Укупна просјечна оцјена:	4.49
Број бодова:		9

б) Научноистраживачки рад

Научноистраживачки рад	
научни рад објављен у истакнутом научном часопису међународног значаја (10 бодова)	
Публикација	бод

1	<p>D. Drljača, Lj. Vukić, D. Dragić, A. Borković, T. Botić, P. Dugić, S. Papuga, M. Šolić, S. Maletić, P. Gvero, J. Savković (2022) Leaching of heavy metals from wood biomass ash, before and after binding in cement composite, <i>Journal of the Serbian Chemical Society</i>, 87(9), 1091-1108.</p> <p>(Web of Science Indexed; IF=0,9)) https://doi.org/10.2298/JSC220217054D</p> <p>Abstract:</p> <p>Wood ash is a complex mixture of inorganic and organic compounds. It is heterogeneous in composition, which can vary considerably. Ash is mainly disposed of in landfills, which creates a risk for air, soil and groundwater contamination by trace elements. In order for wood biomass ash to be used as a secondary raw material, it is necessary to perform leaching tests, to determine which microelements it contains, and which of them could be released into the environment during the ash disposal. Sequential extraction (SE) showed that in the exchangeable and carbonate fraction, the most volatile metals As, Cd, Zn and Pb are released the most from the ash of deciduous trees, while the leaching of ash from coniferous trees is significantly lower. The evaluation of risk assessment code (RAC) for the tested biomass ash samples, indicates that Pb is a high-risk leaching element due to its condensation on the ash particles. By performing toxicity characteristic leaching procedure (TCLP) and synthetic precipitation leaching procedure (SPLP) tests, it was established that the released concentrations of tested metals are below the maximum allowable concentration, given by the regulation. The leaching tests of composites, prepared from wood ash in combination with cement, indicate that the leaching of ash is reduced to a minimum, and that all heavy metals are bound in a cement matrix, which indicates the possibility of using wood ash for construction purposes.</p>	10
Укупно:		10

научни рад објављен у научном часопису међународног значаја (8 бодова)

Публикација		бод
1	<p>D. Dragić, D. Drljača, S. Zorić (2024) Start-up of biofilter for nitrification and effect of filtration rate on the ammonium removal efficiency in drinking water treatment on pilot plant, <i>Water Supply</i>, 24(4), 1207 -1223. https://doi.org/10.2166/ws.2024.038</p> <p>Abstract:</p> <p>Biological filtration is a process that can be used for ammonium removal from water. The removal of ammonium is based on the nitrification process. Nitrification depends on many factors, such as water quality and filtration process parameters. To investigate the influence of filtration rate on the nitrification efficiency, nitrifying biofilters were formed at the pilot plant in the industry for drinking water production from surface water. The new biological filters were started under optimal conditions for biofilm formation. After the biofilm formation, the influence of the filtration rate on nitrification was examined over 3 months (from November to January). The time required for the spontaneous growth of nitrifying bacteria on the new filters was around 70 days. The operating conditions at the start-up period were the continuous flow of water containing $\gamma(\text{NH}_4^+) \approx 1\text{ mg/L}$, dissolved oxygen in a concentration $>9\text{ mg/L}$, filtration rate $<1\text{ m/h}$, inlet water temperature $>12\text{ }^\circ\text{C}$ and pH from 7.8 to 8. After the complete formation of the nitrifying biofilm, the percentage of NH_4^+ removal was greater than 95% for all tested filtration rates, from 0.5 to 8.4 m/h, at $\gamma(\text{NH}_4^+)$ from 1 to 2.5 mg/L and raw water temperature from 13 to 7°C.</p>	8

2	<p>D. Drljača, D. Dragić, A. Borković, T. Botić, R. Jandrić (2023) Removal of bemacid red dye by adsorption on sawdust and carbonized sawdust, <i>Material Protection</i>, 64(1), 65-77.</p> <p>https://doi.org/10.5937/zasmat2301065D</p> <p>Abstract:</p> <p>Today, huge amounts of coloured wastewater, released into ecosystems are a big problem, because they have harmful effects on humans, the environment, as well as the aquatic environment. One of the common treatments for removing dyes from wastewater is the adsorption process, with an emphasis on the use of cheap adsorbents. Therefore, the subject of this paper is the possibility of removing the anionic dye bemacid red (BR) on wood biomass sawdust and carbonized sawdust. The experiments examined the equilibrium contact time, the effect of initial pH, the effect of adsorbent dose, as well as the effect of the initial adsorbate concentration on the process of adsorption. By applying linear kinetic models, it was found that the adsorption process follows a pseudo-second-order kinetic model. It was found that pH does not have a significant effect on adsorption onto carbonized sawdust. By examining the effect of the initial adsorbent dose, it was found that optimal adsorption requires twice the mass of sawdust compared to carbonized sawdust. The use of linear adsorption isotherms shows better agreement with the Freundlich model for both adsorbents. The maximum adsorption capacity for sawdust is 30.18 mg/kg, while for carbonized sawdust it is 74.60 mg/kg. Use of sawdust and carbonized sawdust can be an effective adsorbent for removing the dye bemacid red from wastewater, which is confirmed by the experiment on a real sample of wastewater. The obtained efficiency of dye removal from real wastewater for sawdust is 42.9 %, and for carbonized sawdust 95.1 %.</p>	8
Укупно:		16
научни рад објављен у зборницима са рецензијом са научног скупа међународног значаја (8 бодова)		
Публикација		бод
1	<p>T. Đuričić, D. Bjelić, A. Borković, D. Dragić, S. Pilipović, B.N. Malinović (2024) Applikation of solar energy in water treatment, <i>First International Conference FUTURE-BME 2024: Forging the future - Pioneering approaches in business, management and economics engineering to overcome emerging global challenges</i>, Novi Sad, Proceedings, 965-979, Faculty of Technical Science, University of Novi Sad.</p> <p>Abstract:</p> <p>In addition to the already well-known application in metal production, electroplating, electrochemical energy sources, electrochemistry is also applied in other branches of industry. Today, electrochemical technologies for the treatment of wastewater and drinking water are increasingly present. In recent years, new advanced oxidation processes based on electrochemical technology - Electrochemical advanced oxidation processes (EAOPs), have been developed for the treatment of persistent pollutants, which cannot be removed by conventional water treatments. EAOPs are based on "in situ" electrolytic formation of strong oxidants in an electrochemical reactor, able to degrade almost all organic pollutants. Despite their effectiveness in degrading different types of pollutants, the biggest challenge for EAOPs is high electricity demand to power these systems, which can have serious consequences from both an ecological and an economic point of view. The use of electricity from the distribution network to power electrochemical reactors is the biggest barrier to achieving commercial success of this technology. A possible solution to this challenge is the application of direct solar UV radiation to produce electric energy by use of a solar photovoltaic (PV) arrays for power supply of EAOPs. The aim of the research was to demonstrate the feasibility of using EAOPs directly powered by PV systems, as a sustainable system for efficient water treatment.</p>	8

2	<p>A. Borković, T. Botić, P. Dugić, D. Drljača, T. Đuričić, D. Dragić, S. Pilipović, B. Miladinović (2024) „Relationship of quality, price and toilet soap consumption“, <i>First International Conference FUTURE-BME 2024: Forging the future - Pioneering approaches in business, management and economics engineering to overcome emerging global challenges</i>, Novi Sad, Proceedings, 965-979, Faculty of Technical Science, University of Novi Sad.</p> <p>Abstract:</p> <p>The goal of the research was to identify the characteristics of soap according to the criterion of their importance for the consumer, that is, the customer, and to examine the interdependence of quality, price and consumer habits, that is, consumption. The first part of this research included the procurement and laboratory analysis of the quality of commercial soaps for washing hands on the domestic market. The second part of the research was a survey of the population to collect data based on which consumer habits and implicit values that consumers attach to toilet soaps were assessed. Also, the survey included key indicators of the consumer's living standard as an influencing factor in the consumer's decision when choosing any type of product and/or service. The research results show that consumers use liquid soap more often, and they make purchases mainly in consumer goods stores. Factors that show the greatest influence on the customer's decision when choosing soap are the ratio of quantity and price, price and the smell of the product. For the majority of consumers, the fact that the soap is made on a natural basis is of great importance, and about 70% of respondents are ready to spend more money on soap to contribute to the preservation of the environment. The obtained results can serve as a basis for developing a strategy for increasing the participation of this type of product in the market and consequently improving the quality of the manufacturer's business.</p>	8
3	<p>D. Drljača, J. Lazović, D. Dragić, T. Botić (2023) Quality testing of sodium bicarbonate, <i>XII International conference on social and technological development, STED</i>, Trebinje, Republic of Srpska, Proceedings pp. 429-435, PIM University Banja Luka.</p> <p>Abstract:</p> <p>Sodium bicarbonate (NaHCO_3), also known as baking soda, is widely used in different branches of industry (chemical, food, pharmaceutical, cosmetic, etc.), but also in the household. When talking about the use of baking soda in the household, one of the frequent questions is whether it contains aluminium. Therefore, the aim of this work is to examine the quality of commercially available baking soda products. Samples used for analysing the quality of products are different commercial products found in marketplaces and pharmacies in Banja Luka, and one sample obtained directly from the soda ash factory. In this paper the products were tested for the concentration of NaHCO_3, chlorides, ammonium ion and aluminium, in accordance with standard methods. The results show that the mass fraction of NaHCO_3 for all tested samples is very high (99.30% -99.99%). The tested concentrations of chloride and ammonium ions also show slight deviations in the tested samples, and the obtained values range from 0.00% -0.05%. The presence of aluminium was found in all tested samples in traces, and the obtained values range from 0.0025%-0.0050%. Based on the obtained results, it can be concluded that all tested samples of baking soda from the domestic market are of extremely high purity, while impurities are present in very low concentrations.</p>	8
Укупно:		24
научни рад националног значаја објављен у републичком научном часопису прве категорије (5 бодова)		
Публикација		бод

1	<p>A. Borković, T. Botić, P. Dugić, N. Janjić, J. Todorović, D. Drljača, D. Dragić, S. Pilipović, J. Fraj (2025) Investigation of the Possibility of the Synthesis of Sucrose Esters from Biodiesel, <i>Technologica Acta</i>, 18(1-2), 61-69.</p> <p>Abstract:</p> <p>Growing awareness of the negative environmental impacts of synthetic surfactants and their limited biodegradability require the search for sustainable and environmentally acceptable alternatives. In this context, sucrose esters represent a promising class of green surfactants due to their renewable nature, biodegradability and low toxicity profile. In this work, the synthesis of sucrose derivatives was investigated using sucrose and a mixture of methyl esters of fatty acids (biodiesel), with the use of potassium carbonate as an effective catalyst. The reactions were carried out in the presence of methanol or N,N-dimethylformamide as a solvent, with the aim of examining the influence of reaction conditions on the formation of products. The FTIR technique was used in combination with the appropriate physico-chemical analysis to characterize the obtained synthesis products. The obtained results indicate a significant influence of the choice of solvent on the character of the product, while the use of biodiesel and sucrose as reactants and potassium carbonate as a catalyst provides a perspective for the development of new environmentally friendly surfactants as a promising alternative to synthetic surfactants.</p>	5
2	<p>D. Drljača, D. Dragić, V. Šajinović, A. Borković, S. Pilipović (2025) Optimization of descaling conditions of therapy pools in tourist health center „Banja Kulaši“, <i>Technologica Acta</i>, 18(1-2), 61-69.</p> <p>Abstract:</p> <p>One of the problems in spa centres with thermal water is the deposition of scale on the overflow of therapeutic pools. In practice, scale is removed by washing with a solution of technical hydrochloric acid at a concentration of 10 -16 w/w%. However, this process causes damage to the grout and adhesive, resulting in tile detachment. This study aimed to investigate the possibility of removing scale without significant damage, based on the chemical composition of thermal water, scale, and grout samples taken from the Health and Tourism Centre "Banja Kulaši." Chemical analysis of the scale confirmed that it is of carbonate type (94.32% CaCO₃). The solubility of the scale and grout was tested in two ways - by immersion and by spraying with HCl solutions of varying concentrations. The immersion method showed a total solubility of the examined scale (>98%), while the spraying method aimed to simulate real cleaning conditions of therapeutic pools with different contact times. The solubility of the scale using the spraying method was also high (>92%) for contact times of 5, 10, and 15 minutes. The solubility of the grout depends on both the concentration of HCl and the contact time.</p>	5
3	<p>A. Borković, T. Botić, D. Drljača, D. Dragić, M. Brdar, S. Pilipović, P. Dugić (2024) Optimization of liquid soap formulation, <i>Technologica Acta</i>, 17(1), 49-57.</p> <p>Abstract:</p> <p>The quality of liquid soap for washing hands depends on its chemical composition, and it is evaluated by the physicochemical and functional characteristics of that product. The aim of the work is to prepare different series of liquid soap formulations by varying the concentrations of anionic and amphoteric surfactants and sodium chloride, and to optimize the formulation. The effects of the optimization were evaluated based on the results of the analysis of the physico-chemical parameters of the prepared formulations, such as density, viscosity, surface tension and critical concentration of micelles. As amphoteric and anionic surfactant concentrations in liquid soap increase, density and viscosity values increase. The value of the surface tension decreases with the increase in the concentration of the surfactants present, with the amphoteric surfactant making a greater contribution to the decrease. Regardless of certain advantages that the anionic surfactant shows in relation to the amphoteric one, the best characteristics of the liquid soap are shown by the formulation that contains a combination of both used surfactants. The addition of NaCl to the liquid soap formulation has multiple significance, but also a different effect on the physical and chemical characteristics at lower and higher concentrations. Functional and some physicochemical characteristics of liquid hand washing soap depend on the pH value of the formulation. As the pH value increases, the surface tension and CMC increase to certain values, so pH=5.5 is taken as the optimal pH value of liquid soap, as a compromise between the values of the measured characteristics and the pH value of human skin. This research showed that the formulation containing 5.4 w/w% anionic surfactant, 1 w/w% amphoteric surfactant and 4 w/w% NaCl represents the optimal liquid soap formulation.</p>	5

4	<p>B. Malinović, N. Brestovac, D. Marjanović, D. Dragić, D. Bjelić, T. Đuričić (2023) Application of the principles of green chemistry in the plastic recycling industri: a case study, <i>Technologica Acta</i> 16(2), 21-29.</p> <p>Abstract:</p> <p>The subject of this research was to verify the feasibility of implementing green chemistry principles within the business company „Omorika Reciklaža“ Ltd. situated in Johovac near Doboj, Bosnia and Herzegovina. The objective of this study was to conduct a detailed assessment of the company's facilities and operations, using environmental audits, to identify technological processes (production lines), energy and waste flows, capacities, product range, and other pertinent factors crucial for the application of green chemistry principles. Special emphasis was placed on analyzing each substance that constitutes a raw material, whether used individually or as part of mixtures. The assessment of safety data sheets involved utilizing the CAS registration numbers of substances from the Chemical Abstracts Service, cross-referenced with the ECHA database (European Chemicals Agency). The outcomes, attained through an exhaustive analysis of each substance, were presented as a "chemical inspection" of the company. Through the analysis of all substances and mixtures in the technological process (chemical inspection), as well as the capacity of production flows, energy and resource flows, wastewater, and waste, the potential for enhancing the technological process was identified. This involved reducing dust levels in the workspace, decreasing electricity consumption (utilizing renewable sources), and substituting particularly hazardous chemicals used in the technological process.</p>	5
5	<p>D. Drljača, D. Dragić, S. Banjac (2023) Efficiency of "Brita" home water filter for water purification, <i>Journal of Chemists, Technologists and Environmentalists</i>, 4(1), 20-29.</p> <p>Abstract:</p> <p>Maintaining the quality of drinking water is the basis for the prevention and control of waterborne diseases. Due to the possibility of the presence of various pollutants in water, drinking water preparation at the point of its use is growing rapidly. All this leads to the intensive production of household water purification systems for preparing drinking water or correcting tap water composition if there is any doubt about its quality.</p> <p>The goal of this work is to estimate the efficiency of a home water filter for water purification, the "Brita system", as well as its capacity, during practical use for different types of water (drinking water and spring water). Filtration of water through the "Brita" filter results in quite uneven values of the tested water quality parameters, although these same values are quite uniform in unfiltered samples. This is precisely why it happens that certain quality parameters do not meet the values given by Regulation (pH value, concentration of ammonium ion and orthophosphate ion) at the beginning of the filter use. The occasional appearance of nitrite ion depends on the dynamics of filter use. Therefore, it is recommended to use the "Brita" filter continuously after its activation. The removal efficiency of iron (60-90 %) and aluminum (> 90 %) from water is very effective even after 100 dm³ is passed through the filter. Due to the active carbon granules present in the filter, the removal of trihalomethanes is also very successful.</p>	5

6	<p>D. Raca, Lj. Vukić, D. Drljača, D. Dragić (2023) Adsorption of Bemacid Red dye from aqueous solutions on coal fly ash modified with hydrochloric acid, <i>Journal of Chemists, Technologists and Environmentalists</i>, 4(1), 30-39.</p> <p>Abstract:</p> <p>The adsorption process gives great results for the removal of different types of colored substances or different, mainly organic pollutants from wastewater. In addition to standard adsorbents (such as activated carbon), cheap and natural adsorbents have been increasingly used in recent times (e.g. clay, zeolites), along with waste materials (fly ash from thermal power plants or different agricultural/plant remains), after proper preparation and modification. Research presented in this article was performed with fly ash from thermal power plant Stanari. The aim of this study was to investigate the possibility of removing Bemacid Red (BR) dye from textile industry wastewater by adsorption on fly ash modified with HCl. After a series of experiments, the optimal process parameters were determined. These parameters were then applied to a wastewater sample obtained by simulating polyamide fabric dyeing. The efficiency of adsorption of BR dyes from aqueous solutions depends directly on the process parameters: contact time, pH value, adsorbent dose and initial adsorbate concentration (dye concentration). Under optimal process conditions, a dye removal rate of 97.1 % was achieved. Analyzing the experimentally obtained data using nonlinear adsorption isotherms, a much better agreement of the Freundlich model with the experimental results was determined (the coefficient of determination is $R^2=0.9787$). The obtained data show that the adsorption of Bemacid Red dye on fly ash is multilayered. Optimal parameters of the adsorption process were applied to wastewater obtained by simulating the process of dyeing polyamide fabric with BR dye. The efficiency of adsorption under defined conditions was confirmed through the 100 % removal of dye from a real wastewater sample.</p>	5
7	<p>T. Botić, D. Drljača, P. Gvero, D. Dragić, A. Borković, S. Rakulj (2022) Pretreatment of biomass pellets by acid washing in order to reduce alkaline components, <i>Journal of Chemists, Technologists and Environmentalists</i>, 3(1), 13-19.</p> <p>Abstract:</p> <p>Due to the limited availability of wood, as the highest quality raw material for the production of biomass pellets, increasing attention is being paid to the production and use of pellets from low-quality materials such as different types of agricultural waste. However, the complex chemical composition of these types of biomass often leads to various problems during their combustion. One of the biggest problems when it comes to burning biomass pellets is related to the low melting temperature of the resulting ash and its tendency to sintering. By modifying the chemical composition of biomass, it is possible to influence the method of combustion and the characteristics of residual ash. Modification of biomass composition can be carried out by chemical pretreatment with acids, which reduces the concentration of alkali metals and alleviates ash adhesion and the tendency to form slag. Pellets made from wood biomass, soy straw and chamomile waste from the process of processing medicinal plants were used for the tests in this work. Chemical pretreatment, which consisted in washing the pellet samples with a diluted solution of hydrochloric acid, resulted in mass loss in all cases. The amount of ash, after treatment in hydrochloric acid solution, was reduced by 72.15% - 93.27%, depending on the concentration of acid and the type of biomass.</p>	5

8	<p>B. N. Malinović, T. Đuričić, D. Dragić, R. Malešević, D. Bjelić (2022) Electrochemical removal of hexavalent chromium by electrocoagulation, <i>Technologica Acta</i> 15(1), 23-28.</p> <p>Abstract:</p> <p>Chromium in wastewater is discharged from tannery, electroplating, metal finishing, dying industry and many other industries. Presence of hexavalent chromium (Cr(VI)) in the environment considerable concern because it is non-biodegradable, highly toxic and carcinogen. There are several treatments for the removal of chromium from wastewater, but the most common method involves reduction to its less toxic trivalent state. In this paper electrocoagulation was used as treatment for removing of hexavalent chromium from synthetic prepared wastewater initial concentration 50 mg/L, in presence of sodium chloride as supporting electrolyte (1 g/L). The treatment was perform in a batch electrochemical reactor 250 mL capacity and with possibility of constant stirring. It was examined the impact of electrode materials and current density (5, 10, 20 mA/cm²) on Cr(VI) removal efficiency. The examination showed that iron has higher removal efficiency compared to aluminium. Also, it was observed high efficiency at very begin of treatment and at low current density. For 20 minutes of treatment it was achieved almost complete Cr(VI) removal at current density of 5 mA/cm² by using iron electrodes (E= 99.8 %).</p>	5
9	<p>A. Borković, P. Dugić, T. Botić, D. Markuljević, D. Drljača, D. Dragić (2021) Efficiency of degreasing by dishwashing detergents, <i>Technologica Acta</i>, 14(2), 23-29.</p> <p>Abstract:</p> <p>Consumption of agents for manual and machine washing of dishes is constantly increasing. Although the growth of the use of dishwashers is evident, hand dishwashing is still dominant in our region. A good dishwashing detergent must effectively remove food residues and degrease the surface of dishes, made of different materials, while the surfaces of washed dishes should remain smooth, shiny with a pleasant smell of freshness. The requirements of consumers-users of these funds are, in addition to the listed basic functions, also practicality of handling and dosing, pleasant smell and mild action on the hands and acceptable price. The aim of this paper is to examine the degreasing efficiency of commercial detergents from our market on four types of fats. In addition to commercial dishwashing detergents, whose composition is known only roughly indicated in the producer declaration, was tested a laboratory prepared sample with exactly known composition. All tests of the degreasing ability of dishes with different types of impurities were performed under the same conditions with a change in the concentration and type of detergent, and according to the method used by some industrial detergent manufacturers. It was found that in addition to the concentration of detergent in the washing solution, the degreasing efficiency is affected by the type and concentration of surfactants, as well as auxiliary components that are part of the product.</p>	5
Укупно:		45
научни рад националног значаја објављен у републичком научном часопису друге категорије (3 бода)		
Публикација		бод

1	<p>T. Botić, P. Gvero, D. Drljača, A. Borković, D. Dragić, S. Rakulj (2022) Testing of small household biomass boilers from the aspect of waste gas emissions, <i>STED Journal</i>, 4(2), 12-20.</p> <p>Abstract:</p> <p>The use of biomass for energetic purposes is actual issue from different aspect of views, such as economy, used technologies, combustion specifications, environmental issues, etc. Different types of biomass are available on the market today. During the combustion process in furnaces, these types of biomass behave differently due to their specific physicochemical properties. In this research, used biomass types were wood biomass, soybean straw and chamomilewaste from medicinal herbs processing. Pellet combustion was performed in a commercial furnace that was designed to heat the living space by burning wood pellets. Furnace was installed with measurement system for emissions of combustion products. The current law regulation of the Republic of Srpska in the field of environmental protection doesnot include testing of emissions of combustion products for plants with power less than 100 kW. In this research, theinfluence of pellet type on concentrations of carbon monoxide and nitrogen oxides was investigated, as well as thevolume content of oxygen in the waste gas for plants with power less than 100 kW. Also, it was investigated whether theaddition of additives (clay, kaolinite, bentonite), used to improve the melting characteristics of ash, has an effect onreducing the emission of combustion products. The results obtained by measuring the gas emissions are compared withthe standard EN 14785 which is related to the emission of carbon monoxide and nitrogen oxides. During this research,characteristic of ash left after combustion of tested pellets was examined. According to these examinations, it canbe pointed out that potential problems can occur when burning these types of pellets in small household heating furnaces.</p>	3
Укупно:		3
активно учешће на међународном научном скупу (5 бодова)		
	Публикација	бод
1	<p>S. Pilipović, T. Botić, B.N. Malinović, T. Đuričić, A. Borković, D. Dragić. Effect of cationisation on the functional properties of starch, <i>XV International conference of social and technological development - STED</i> (2026): Trebinje, Book of Abstracts (p. 72), June 04-07, PIM University Banja Luka.</p> <p>Abstract:</p> <p>Native starch exhibits significant limitations in its application in the chemical, food, and pharmaceutical industries due to unfavourable properties such as low solubility, retrogradation, syneresis, thermal degradation, and high viscosity after gelatinization. To improve its functional properties and broaden its range of applications, native starch requires modification. There are numerous methods of modification, most often classified into three categories: physical, chemical, and enzymatic. Chemical modification techniques enable a wide range of functionalization without degrading the polymer chain. Cationization, as a type of chemical modification, is considered one of the most effective methods for improving starch properties. It enhances swelling power and solubility, increases water absorption capacity, improves emulsion stability, resistance to syneresis, and stability at high pH values, while reducing retrogradation tendency and gelatinization temperature. This study investigates the effect of starch cationization on swelling power (g/g), water absorption capacity (g/g), and solubility (%) of modified starch compared to native starch. The results show that even at a very low degree of cationization, these properties determined at room temperature can be improved. The swelling power of cationic starch synthesized at a temperature of 50 °C for 2.5 h can be increased up to 16.5 times, and the water absorption capacity about 25.5 times. Solubility also changes significantly. After modification, about one quarter of the starch mass became water-soluble, whereas the native starch before modification contained only 1.66% of water-soluble components.</p>	5

2	<p>T. Đuričić, B.N Malinović, D. Bjelić, A. Borković, D. Dragić, S. Pilipović, T. Vulin. Treatment of textile dye wastewater by solar-powered electrooxidation, <i>XV International conference of social and technological development - STED</i> (2026): Trebinje, Book of Abstracts (p. 73), June 04-07, PIM University Banja Luka.</p> <p>Abstract:</p> <p>Wastewaters represent one of the biggest problems today as they contain many pollutants, some of which are well-known pollutants, while there are also those whose impact on human health and the ecosystem has not been fully investigated. There are many persistent pollutants that cannot be removed by conventional wastewater treatment technologies, which causes great concern regarding their impact on human health. For this reason, the study, development and implementation of advanced technologies in wastewater treatment are of great importance. In recent years, new advanced oxidation processes based on electrochemical technology - electrochemical advanced oxidation processes (EAOPs), have been developed for the treatment of persistent pollutants. EAOPs are known not only as very efficient technologies but also as large consumers of electricity. In this research EAOP were used for the treatment of textile dye wastewater. In order to eliminate their biggest drawback, instead of being powered by the distribution network, the electrochemical reactor was powered by solar panel. A battery was used to store the energy obtained from the solar panel to ensure continuous operation and avoid energy fluctuations. The key parameters that affect the efficiency of the process, the economic feasibility and the potential for real-scale application were examined.</p>	5
3	<p>D. Dragić, D. Drljača, S. Vrakelja, S. Pilipović, A. Borković, T. Botić, S. Vuletić. Geopolymer synthesis: assessment of the potential use of fly ash from TPP Stanari and waste borosilicate glass, <i>IX International Scientific-Professional symposium "Environmental resources, sustainable development and food production"-OPORPH</i>, (2025): Tuzla, Book of Abstracts (p. 35), November 12-13, Faculty of Technology, University of Tuzla.</p> <p>Abstract:</p> <p>Geopolymers are inorganic, polymeric materials synthesised through the alkaline activation of aluminosilicates. Producing geopolymers from aluminosilicate waste materials provides a sustainable alternative to cementitious materials, enabling the efficient utilisation of industrial wastes. This study explores the synthesis of geopolymers from fly ash (FA) from the TPP Stanari and waste borosilicate glass (WBG). Several compositions were prepared: 100 wt.% FA, 80 wt.% FA + 20 wt.% WBG and 60 wt.% FA + 40 wt. % WBG. Alkaline activation was performed using a 1:1 mixture of 12M NaOH and sodium silicate solution at different liquid-to-solid mass ratios (1, 0.8, 0.6). Samples were analysed by FTIR spectroscopy, and the degree of alkaline activation was determined in all samples. A shift in the FTIR peak from $\sim 1030\text{ cm}^{-1}$ in the raw materials to $\sim 960\text{ cm}^{-1}$ in the hardened samples confirmed the geopolymerization process, indicating aluminosilicate dissolution and the formation of a new amorphous geopolymer phase. The highest degree of activation (72.41%) was observed in the FA-only sample at a liquid-to-solid ratio of 1:1. The use of FA and WBG for geopolymer synthesis demonstrates a promising pathway toward sustainable development. By converting industrial wastes into valuable materials, this approach reduces waste, conserves resources, and lowers CO₂ emissions, thereby supporting circular economy principles and sustainable construction practices.</p>	5

4	<p>B. Malinović, T. Đuričić, P. Sailović, D. Dragić, S. Pilipović, A. Borković, D. Bjelić. Electrochemical removal of hexavalent chromium by electrocoagulation: comparative study of batch and continuous reactor performance, <i>6th Metallurgical & Materials Engineering Congress of South-East-Europe - MME SEE</i> (2025): Trebinje, Book of Abstracts (vol.6(1)), June 04-07, Association of Metallurgical Engineers of Serbia.</p> <p>Abstract:</p> <p>This study explores the effectiveness of electrocoagulation (EC) for removing toxic hexavalent chromium (Cr(VI)) from industrial wastewater using iron and aluminum electrodes in both batch and continuous modes. Iron electrodes demonstrated superior performance, achieving up to 99.8% Cr(VI) removal in batch mode at an optimal current density of 5 mA/cm², while continuous operation at 50 L/h achieved comparable removal after 30 minutes, with slightly lower efficiency due to reduced retention time. The lowest specific energy consumption (2.82 kWh/kg Cr(VI)) was also recorded under these optimal conditions, highlighting economic feasibility. Fourier-transform infrared (FTIR) analysis of the sludge confirmed the reduction of Cr(VI) to the less toxic Cr(III), primarily in the form of Cr(OH)₃. Characteristic peaks indicate Cr-O vibrations in chromium hydroxide, while the presence of hydroxyl (-OH) groups confirms the formation of iron hydroxide complexes that facilitate Cr(VI) adsorption and precipitation. Additional spectral features suggest the presence of iron oxides, further supporting the electrocoagulation mechanism involving the generation of coagulant species in situ. Overall, the results affirm EC as a highly efficient and cost-effective treatment method, particularly suitable for large-scale applications.</p>	5
5	<p>T. Đuričić, D. Dragić, S. Pilipović, A. Borković, D. Drljača, D. Bjelić, B. Malinović. Mathematical modeling of nickel removal by coagulation and flocculation process, <i>IX International Congress "Engineering, Environment and Materials in Process Industry - EEM</i> (2025): Bijeljina, Book of Abstracts (12), April 02-04, Faculty of Technology Zvornik, University of East Sarajevo.</p> <p>Abstract:</p> <p>In this study, the effects of coagulant and flocculant concentrations, as well as their interaction on the efficiency of Ni removal through the coagulation and flocculation process of real wastewater from the metal industry were examined. A 3² factorial design was used for the design of the experiment, with two independent variables: coagulant concentration (Factor A) and flocculant concentration (Factor B), each factor at three concentration levels. The dependent variable that was monitored after the treatment was the Ni removal efficiency (%) (Response - R1). In the coagulation/flocculation wastewater treatment, ferric chloride (80 mg/L, 120 mg/L, 160 mg/L) was used as the coagulant, and polyacrylamide Superfloc A-110 (5 mg/L, 10 mg/L, 15 mg/L) was used as the flocculant. Statistical analysis of the results, analysis of variance (ANOVA), showed that there was no statistically significant interaction between the two factors in the tested concentration range in the case when precipitation at pH 10 was previously performed on the sample of wastewater. A linear empirical model was developed for the coagulation and flocculation process to estimate Ni removal efficiency. The addition of flocculant had a greater effect on Ni removal efficiency compared to the coagulant concentrations used in the process. This was also confirmed by the residual Fe concentration in the samples of water after the treatment. The developed linear model and graphical representation of developed model allowed the determination of optimal conditions for Ni removal efficiency through the coagulation and flocculation process. The maximum overall Ni removal efficiency of 96.55%, for an initial Ni concentration of 7.07 mg/L in wastewater, was achieved by applying the optimal FeCl₃ dose of 80 mg/L, with an optimal flocculant concentration of 15 mg/L, under the following conditions of coagulation/flocculation treatment: pH 8, temperature 19.5°C, with prior precipitation at pH 10 and separation of the primarily formed sludge.</p>	5

6	<p>S. Pilipović, D. Drljača, T. Botić, D. Dragić, A. Borković. Adsorption of methylene blue on waste newspaper, <i>XIV Conference of Chemist, Technologists and Environmentalists of Republic of Srpska</i> (2022): Banja Luka, Book of Abstracts (p. 190), October 21-22, Faculty of Technology, University of Banja Luka.</p> <p>Abstract:</p> <p>Methylene blue is a cationic dye that is most often used in paper and graphic, but also in the textile industry. Removing this color from industrial wastewater turned out to be a big challenge. Numerous authors examined the possibility of applying the phenomenon of adsorption with different materials for the stated purpose. In this research the possibility of using waste newspaper as an alternative adsorbent for the removal of methylene blue from aqueous solutions was examined. The efficiency and capacity of adsorption were determined by a series of experiments in which the effects of contact time, pH value, mass of adsorbent and initial concentration of the adsorbate solution were monitored. It was shown that adsorption of MB on newspaper is favored by a high pH value of the solution. For the optimal contact time, a period of 60 min has been established. The mass of the adsorbent also plays an important role in adsorption. Applying optimal adsorption conditions (contact time 60 min, pH=11, initial adsorbate concentration 100 mg/dm³, adsorbent dose 1.5 g/dm³) a capacity of 56.6 mg/g was achieved with a removal efficiency of 85%. Equilibrium isotherms for the removal of methylene blue were analysed by the Langmuir and Freundlich isotherm models and kinetic studies were performed by pseudo-first-order and pseudosecond-order. Based on this research, it can be concluded that waste newspaper can find its application as a very efficient, cheap and available adsorbent.</p>	5
Укупно:		30

в) Бодови на основу просјечне оцјене првог и другог циклуса студија

Просјечна оцјена првог циклуса студија	9.67
Просјечна оцјена другог циклуса студија	10
Укупно бодова	98.35

ИСПУЊЕНОСТ УСЛОВА ЗА ИЗБОР

Означити да ли кандидат испуњава услове за избор <div style="float: right; border: 1px solid black; padding: 2px 5px;">?</div>
☒ ДА ☐ НЕ
За избор у звање вишег асистента може бити биран кандидат који: 1. има завршен други циклус студија у одговарајућој области са најнижом просјечном оцјеном и на првом и на другом циклусу студија 8,0 или еквивалент; 2. има научни степен магистра наука у одговарајућој области са најнижом просјечном оцјеном на основном студију 8,0 или еквивалент (Закон о високом образовању, члан 81.)

Приказ укупног броја бодова кандидата:

ОПИС	УКУПНО
Вредновање наставничких способности	9
Научноистраживачки рад	128
Бодови на основу просјечне оцјене	98.35
Укупно:	235.35

IV ЗАКЉУЧНО МИШЉЕЊЕ

Уколико се на Конкурс пријавило више кандидата, у Закључном мишљењу обавезно је навести ранг-листу свих кандидата са назнаком броја освојених бодова, на основу које ће бити формулисан приједлог за избор/неизбор.

На Конкурс за избор сарадника на ужу научну област Хемијске технологије који је објављен у дневном листу *Глас Српске* и на интернет страници Универзитета у Бањој Луци 30.09.2026. године, пријавио се један (1) кандидат:

- Дајана Драгић, ма, дилп. инж. хем. технологије

У достављеном конкурсном материјалу кандидат Дајана Драгић, ма, поред материјала којим потврђује испуњеност услова за избор у вишег асистента, доставила је и своја остала постигнућа остварена у изборном периоду вишег асистента:

1. Увјерења о похађању обуке:

- Професионално усавршавање за унапређење наставног процеса на Универзитету у Бањој Луци из 2024. године, и
- Професионално усавршавање за унапређење наставног процеса на Универзитету у Бањој Луци из 2025. године.

2. Доказ о отвореним налозима на научним платформама за цитирање:

- Google Scholar,
- Web of Science,
- ResearchGate,
- ORCID.

3. Остало:

- Certificate of Attendance for Poster Presentation "Effect of Cationization on the Functional Properties of Starch" STED 2026,
- Certificate of Attendance for Poster Presentation "Treatment of textile dye wastewater by solar-powered electrooxidation" STED 2026,
- AWARD THE BEST POSTER OF EEM2025,
- Certificate of Participation OPORH 2025,
- Certificate of Acknowledgement FUTURE BME 2024,
- Certificate of Attendance for Poster Presentation STED 2023,
- Certificate of Attendance for Poster Presentation STED 2022,
- Захвалницу Републичко педагошког завода РС и УНИБЛ за учествовање у организацији зимског кампа "Желим више" 2026. године,
- Захвалницу Републичко педагошког завода РС и УНИБЛ за учешће и реализацији радионице на Љетном кампу "Желим више" 2026. године,
- Захвалницу за учествовање у организацији Фестивала науке 2025. године,
- Захвалницу за учествовање у организацији Фестивала науке 2024. године,
- Захвалницу за подршку и учешће на пројекту "Значај циркуларне економије у заштити животне средине" 2023. године,
- Захвалницу за допринос и учешће на прољетној школи за студенте "Зелена хемија за зеленију будућност", 2025. године,
- Захвалницу за допринос и учешће на семинару "Зелена хемија и хемијска сигурност (управљање хемикалијама)" 2023. године,
- Certificat o učešću na treningu "Implementacija principa zelene hemije u industriji" 2022. godine,
- Certificat o učešću na treningu "Modul 2: Implementacija principa zelene hemije u industriji" 2022.

Детаљним прегледом достављене конкурсне документације и на основу свега што је представљено у овом Извјештају, именована Комисија констатује сљедеће:

Према основним условима које прописује *Правилник о поступку и условима избора наставника и сарадника на Универзитету у Бањој Луци*, кандидаткиња има укупно **235,35 бодова**.

У току свог рада на Технолошком факултету у својству вишег асистента Дајана Драгић, ма је објавила 16 научних радова (штампаних у цјелини) и 6 Абстраката са међународних научних скупова у часописима међународног и националног значаја, као и међународним конференцијама, међу којима је и рад у истакнутом научном часопису међународног значаја (IF: 0,9) и 2 рада у научним часописима међународног значаја.

Иако се образовна дјелатност кандидата за избор сарадника не бодује, евидентно је да је кандидат Дајана Драгић прошла многа корисна усавршавања у научној области на коју се бира. Такође, према приложеним анкетама о оцјени наставног рада и доказаним наставничким способностима на групи повјерених јој предмета, остварила је високу оцјену - 9 бодова.

Дакле, Комисија са правом констатује, да је кандидаткиња, у току свог радног искуства у звању вишег асистента, остварила богату научно-истраживачку активност, исказану кроз објављене научне радове, усавршавање, као и завидан квалитет обављања повјерене јој рачунске и практичне наставе.

На основу свега изложеног, а у складу са Законом о високом образовању Републике Српске и *Правилницима о поступку и условима за избор наставника и сарадника на Универзитету у Бањој Луци*, Комисија са задовољством предлаже Научно-наставном Вијећу Технолошког факултета и Сенату Универзитета у Бањој Луци да **кандидата Дајану Драгић, ма поново изабере у звање вишег асистента за ужу научну област Хемијске технологије.**

Потпис чланова комисије

- 1 Проф. др Дијана Дрљача, ванред. проф., с.р.
Технолошки факултет
Универзитет у Бањој Луци
- 2 Проф. др Татјана Ботић, ред. проф., с.р.
Технолошки факултет
Универзитет у Бањој Луци
- 3 Проф. др Драгана Кешељ, ванред. проф., с.р.
Технолошки факултет Зворник, Универзитет у
Источном Сарајеву

У Бањој Луци, 28.10.2026. године

V ИЗДВОЈЕНО ЗАКЉУЧНО МИШЉЕЊЕ

Образложење члан(ов)а Комисије о разлозима издвајања закључног мишљења.

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Потпис чланова комисије

1 _____

У Бањој Луци, _____._____. година

Извјештај комисије сачињава се у складу са:

1. Законом о високом образовању („Службени гласник Републике Српске”, број: 67/20 и 107/24)
2. Правилником о условима за избор у научно-наставна, умјетничко-наставна и сарадничка звања („Службени гласник Републике Српске”, број: 69/23 и 53/24)
3. Правилником о поступку за избор у научно-наставна, умјетничко-наставна и сарадничка звања на Универзитету у Бањој Луци, број: 02/04-3.2592-3-1/23 од 30.11.2023. године, број 02/04-3.1453-2/24 од 04.07.2024. године и број: 02/04-3.1163-1-1/26 од 30.04.2026. године.