5. Zubov, O., Zubova L. (2011). Protecting Donbass landscapes from the ingress of pollutants from the dumps of coal mines. Уголь Украины, 40-46.

6. Zubov, O., Zubova L. (2020). Влияние изменения климата на факторы водной эрозии в донбассе. Лесная мелиорация и эколого-гидрологические проблемы Донского водосборного бассейна, 521-525.

7. Awadhesh S., Yogendra S., Vinod P. (2020). Phytoremediation of Pollutants from Soil. Plant Responses to Soil Pollution, 155-161.

8. Klimkina I., Kharytonov M., Wiche O (2017). Phytoremediation of spoil coal dumps in Western Donbass (Ukraine), 48-53.

9. Бровко Ф. (2012). Сучасні проблеми та здобутки лісової рекультивації відвальних ландшафтів в Україні. (1). http://nbuv.gov.ua/UJRN/licgoc_2012_1_6

10. Дурсун, Ш., Симочко, Л. Ю., & Манколлі, Х. (2020). Bioremediation of heavy metals from soil: an overview of principles and criteria of using. Agroecological Journal, 0(3), 6-12. https://doi.org/10.33730/2077-4893.3.2020.211521

METHODOLOGY OF RESEARCHING THE PROCESS OF OBTAINING COMPOSITE FUEL FROM COAL PROCESSING WASTE

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Purpose. In solving the problem of developing coal preparation wastes in the production of composite fuels, such as coal sludge and braize, reliable knowledge about various physical and mechanical characteristics of waste is important [1-5], since they are the initial calculated values for equipment design [6-10].

Methodology. To study the process of electrokinetic agglomeration and the choice of optimal parameters, a complex technique is required, including the determination of: physical, mechanical and chemical properties of the initial coal sludge, ways of influencing the production mode of compositions by bringing the state of the initial material to its required parameters (preparation and influence on physical and chemical properties).

Findings. The physical and mechanical characteristics of the studied waste vary in a very wide range; in particular, bulk density – 1150-2350 kg/m^3, moisture content – 6-65%, particle size – from dust-like classes +0 mm to large +6 mm, etc. It should be noted that various compositions of coal sludge differ significantly in their physical and mechanical characteristics, depending not only on the composition of the components, but also on moisture content. A wide variety of the investigated slimes and braizes made it possible to create more than 1000 solid fuel compositions.

Electrokinetic agglomeration of coal sludge requires preparation, which, depending on the physical, mechanical and chemical properties of the initial material, includes the following: 1) technical analysis: determination of moisture content, ash content, volatile matter yield, heat of combustion, sintering capacity; 2) research using elemental analysis: determination of the content of carbon and hydrogen, nitrogen, sulphur; 3) possible drying of the initial charge to the required

moisture content for production (in the case of exceeding sufficient moisture content); 4) screening out a coarse fraction exceeding 10-15 mm (rocks that got into the sludge, due to production costs and the location of the storage dump).

The physical and chemical effect on the properties of coal sludge includes a number of measures and calculations for the amount and percentage of activating substances that change the sign and magnitude of the particle charge.

They contain the research, which were conducted within the project GP–505, financed by Ministry of Education and Science of Ukraine.

Keywords: electrokinetic agglomeration, waste of coal preparation, coal slime and braize, physical and mechanical characteristics, compositions.

References

1. Кузік, І.М. (2012). Вплив породних відвалів шахт на компоненти довкілля та визначення можливостей щодо його зменшення. Екологія і природокористування, 15, 31-37.

2. Дычковский, Р.Е., Поротников, В.В., Котов, Ю.В., Григорьев, С.П. (2003). Направления развития высокопродуктивных технологий выемки угля. Науковий вісник НГУ, (11), 11-14.

3. Кроїк, Г.А., Мельник, О.В. (2012). Закономірності розподілу техногенних та токсичних елементів у відходах добування та переробки вугілля Західного Донбасу. Вісник ДНУ, серія «Геологія. Географія», 14(Т.20), 77-82.

4. Petlovanyi, M., Kuzmenko, O., Lozynskyi, V., Popovych, V., Sai, K., Saik, P. (2019). Review of man-made mineral formations accumulation and prospects of their developing in mining industrial regions in Ukraine. Mining of Mineral Deposits, 13(1), 24-38. https://doi.org/10.33271/mining13.01.024

5. Білецький, В.С., Сергєєв, П.В. (2013). Утилізація відходів збагачення вугілля шляхом їх брикетування. Збагачення корисних копалин, 53(94), 205-209.

6. Самойлік, В.Г., Білецький, В.С., Гудінов, Д.В. (2013). Вплив мінеральної компоненти на технологічні характеристики водовугільного палива. Збагачення корисних копалин, 53(94), 91-95.

7. Елишевич, А.Т. (1989). Брикетирование полезных ископаемых. Москва: Недра, 300 с.

8. Гайдай, А.А. (2006). Исследования прочностных свойств брикетов из угольных шламов и штыбов, полученных способом холодного окускования. Сб. научн. тр. НГУ, 26(1), 208.

9. Pavlychenko, A., Haidai, O., Firsova, V., Ruskykh, V., & Tkach, I. (2020). Technological directions of coal enrichment waste processing. Collection of Research Papers of the National Mining University, 62, 139-148. https://doi.org/10.33271/crpnmu/62.139

10. Pavlychenko, A., Haidai, O., Firsova, V., & Lampika, T. (2020). Optimization of physical and mechanical parameters of fuel products obtained from treatment of coal industry waste. Collection of Research Papers of the National Mining University, 63, 88-97. https://doi.org/10.33271/crpnmu/63.088