UDC 628.52

**Bogdan V. Pelishenko**
**Alla A. Slobodianiuk**

# RESEARCH OF ENVIRONMENTAL TECHNOLOGIES OF FERROUS METALLURGY

Vinnytsia National Technical University

***Анотація***

*Чорна металургія, яка включає в себе виробництво металів, таких як залізо, чавун, сталь, може мати значний негативний вплив на навколишнє середовище через різні аспекти свого виробництва. Дослідження технологій екологізації колорової металургії є дуже важливим напрямом в сучасній індустрії, оскільки металургійний сектор має значний вплив на навколишнє середовище через викиди, використання води та енергії. Екологізація процесів виробництва може допомогти зменшити негативний вплив на довкілля.*

**Ключові слова:** промисловість, забруднення, технології, металургія.

***Abstract***

*Ferrous metallurgy, which includes the production of metals such as iron, cast iron, and steel, can have a significant negative impact on the environment through various aspects of its production. Research on greening technologies of non-ferrous metallurgy is a very important direction in modern industry, as the metallurgical sector has a significant impact on the environment through emissions, water and energy use. Greening of production processes can help reduce the negative impact on the environment.*

**Key words:** industry, pollution, technologies, metallurgy.

## Introduction

Metallurgy is the material basis of the development of all non-alternative branches of the national economy. The main ultimate goal of metallurgical production is to obtain metals from processed raw materials in the free metallic state or in the form of a chemical compound. In practice, this is solved with the help of special technological operations and methods that ensure the separation of waste rock components from valuable components of raw materials. The blast furnace process is one of the main sources of atmospheric pollution. In the process of smelting iron, the air is polluted by dust, carbon monoxide and sulfur dioxide during the preparation of the ore. It has been experimentally established that a foundry with an annual output of 100,000 tons of iron, equipped with dust collectors with a cleaning efficiency of up to 80%, annually emits up to 1,000 tons of dust into the air. For each ton of cast iron, about 2,000 m3 of blast furnace gas is produced, which is used in the blast furnace to heat the air heaters, so it practically does not enter the atmosphere. Blast furnace production is a source of technological wastewater pollution during the following operations: hydraulic collection of settling dust, blast furnace gas cleaning, overflows in the bunker room. The blast furnace slag granulation process and pig iron spillage are also sources of water pollution.

## Research Results

Reducing the number of harmful emissions in steelmaking is achieved by various technological methods and devices. The mechanization of manual operations is of great importance. To reduce harmful emissions it is common to assume mechanized loading of the charge; suspended bunkers for loose materials and ferroalloys; automated systems for downloading these materials; equipment for the mechanization of works on maintenance of converters and mixer devices; mechanization of cleaning slag under the converters and garbage at the workplaces; mechanization of breaking worn lining of the main units, cleaning of waste.

Among the technologies that are necessary for the greening of metallurgy, recycling can be attributed, since the waste from processing is very large and it is not used anywhere. The use of secondary raw materials in

metallurgy is an important aspect for reducing production costs and reducing the impact on the environment. Metallurgical scrap is waste that occurs in the process of metal production. They can be waste from trimming or cutting metal sheets, used coatings, processing residues or other waste. Metallurgical scrap processing is an important component for ensuring sustainable production of metals. This scrap can be reused in metallurgical production as a secondary raw material for the production of new metal materials. Scrap recycling helps reduce dependence on primary raw materials, reduces emissions and waste associated with the extraction and processing of primary ores, and contributes to the conservation of natural resources.

## Conclusions

Recycling of scrap metal is an important component for ensuring sustainable production of metals. Greening and the implementation of environmental protection technologies in metallurgy is an important aspect, as it allows you to preserve exhaustible minerals, make enterprises more economical in terms of energy resources, reduce emissions of solid household waste and their launch into secondary production, reduce emissions of dense dust particles that are harmful human health.

## REFERENCES


1. Вплив металургійного виробництва на довкілля. Лекційний курс Рівненського державного гуманітарного університету. URL : https://kegt.rshu.edu.ua/images/dustan/l_o_p_3.pdf (дата звернення 06.05.2024)
2. Техноекологія: Навчальний посібник / М. О. Клименко, І. І. Залеський. – Рівне, 2010. URL : https://ep3.nuwm.edu.ua/2731/1/%D0%9A%D0%BB%D0%B8%D0%BC%D0%B5%D0%BD%D0%BA%D0%BE%20%D0%9C.%20%D0%9E.%20%D0%A2%D0%B5%D1%85%D0%BD%D0%BE%D0%B5%D0%BA%D0%BE%D0%BB%D0%BE%D0%B3%D1%96%D1%8F.pdf (дата звернення 06.05.2024)
3. WIKIPEDIA. Ferrous Metallurgy. URL : https://en.wikipedia.org/wiki/Ferrous_metallurgy (дата звернення 07.05.2024)



***Пелішенко Богдан Вікторович*** – студент групи ТЗД-22б, факультет будівництва, цивільної та екологічної інженерії, Вінницький національний технічний університет, м. Вінниця, e-mail: bohdanpelichenko@gmail.com

***Науковий керівник: Слободянюк Алла Анатоліївна*** – старший викладач кафедри іноземних мов, Вінницький національний технічний університет, м.Вінниця, e-mail: a.allavin@gmail.com

***Bohdan Viktorovych P.*** **–** student of Faculty of Construction, Civil and Environmental Engineering, Vinnytsia National Technical University, Vinnytsia, e-mail: bohdanpelichenko@gmail.com

***Scientific Supervisor: Slobodianiuk Alla A.*** – Senior Lecturer of the Foreign Languages Department, Vinnytsia National Technical University, Vinnytsia, e-mail: a.allavin@gmail.com