



III International Scientific Conference “Sustainable and efficient use of energy, water and natural resources – SEWAN-2021”

ГАЛАХИМ



Research of processing of lead-containing raw materials for the purpose of modernization and improving the quality of existing technology processes

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East Kazakhstan Technical University is located on a unique territory, which is often called the pearl of Kazakhstan. The steppes and semi-deserts of Asia in combination with the mountain taiga of Siberia give a special beauty to the landscape.



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The uniqueness also lies in the fact that the largest mining and metallurgical complexes are located next to the University - Kazzinc LLP, UMP, TMK UK and a number of gold mining enterprises with which we work closely, both in the field of personnel training, and in the sphere of performing research work on problematic issues of enterprises.

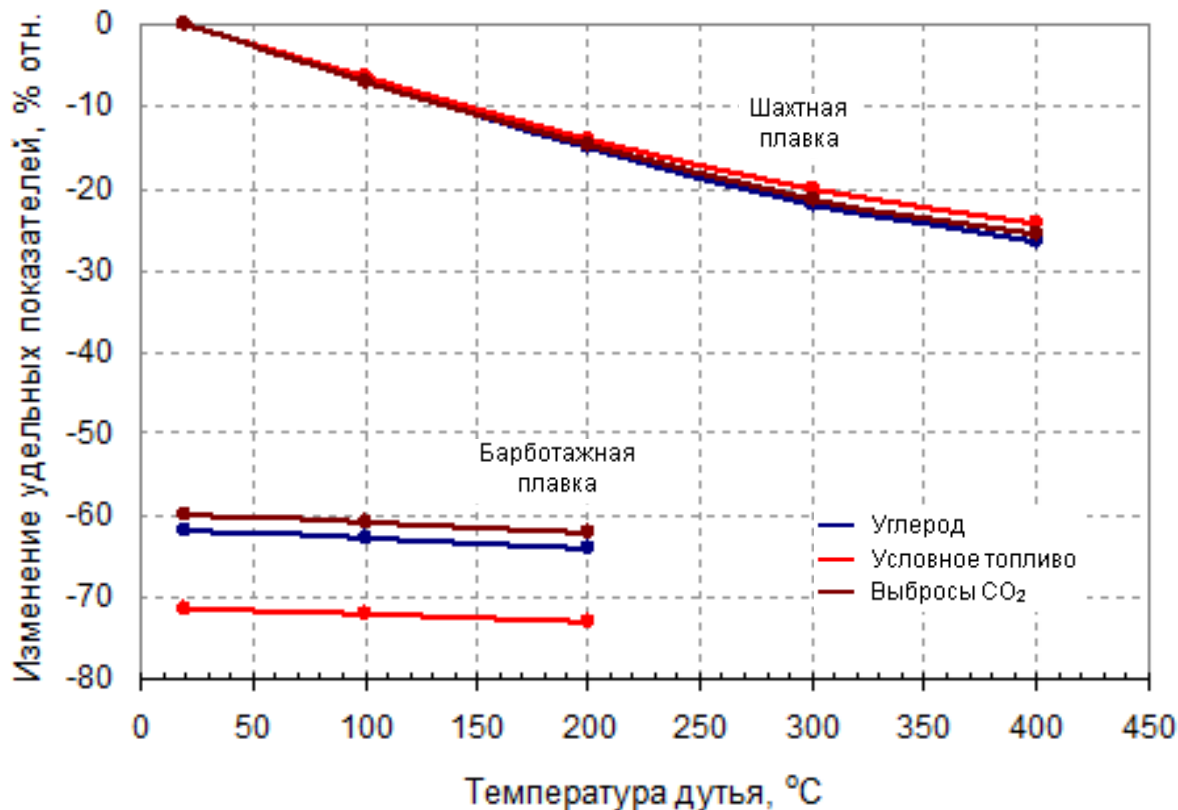


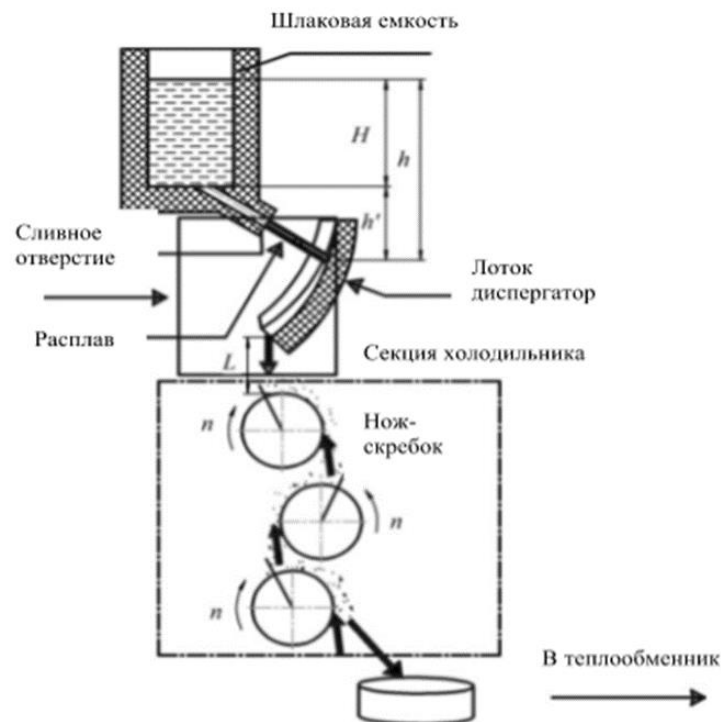
The fuel and energy complex plays a significant role in the economic development of Kazakhstan. In metallurgy, up to one third of all energy resources used by industry are consumed, therefore, the search for new most effective energy-saving technologies is constantly being carried out.

The problem of greenhouse gases emitted into the atmosphere is closely related to the consumption of fuel and energy resources, which changes the climatic conditions on the planet.

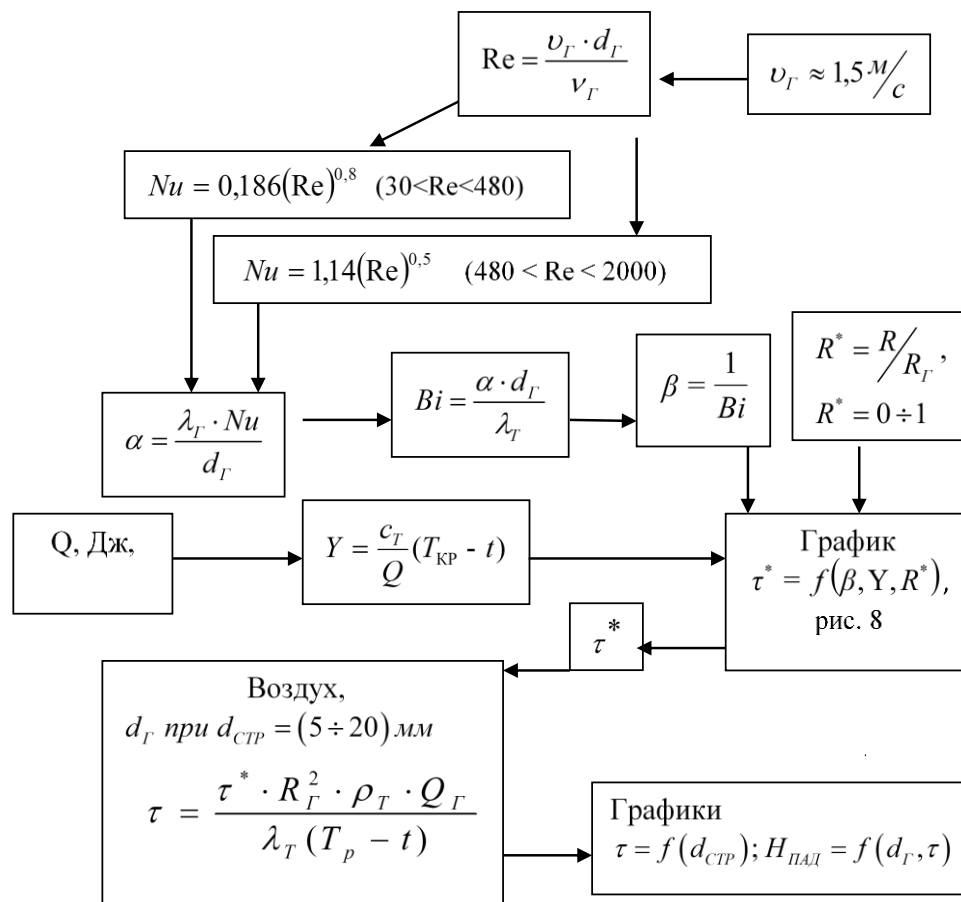


For example, in the lead and zinc production of KAZZINK LLP, about 165,000 tons of solid fuel (coke, anthracite coal). At the same time, greenhouse gas emissions from the combustion of this fuel amount to about 330,000 tons (CO₂) or 168 million m³.





Heat loss with slag in the heat balance is up to 30 - 40%. At the same time, the temperature of liquid slag reaches 1300 - 1350 ° C. At present, the heat of dump slag is irretrievably lost when cooled with water.



An algorithm is proposed for calculating the solidification time of a slag granule by a numerical method according to the graphs of dimensionless coefficients



Appearance of laboratory granulator for dry granulation of slag melts.

A heat exchanger for heat recovery has been designed and manufactured.

When implementing the process of utilizing the heat of molten slag using the dry granulation method, it is possible to obtain air with a temperature of 600 ° C, which can be sent to the shaft furnace of lead production, which will save up to 30% of coke and, accordingly, reduce greenhouse gas emissions.

- **The estimated reduction in unit carbon costs and CO2 emissions was 30.2–35.5%;**
- **Saving resources - 7M \$ / y;**
- **Disposal of irrevocably lost heat from molten materials.**



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Thank you for your attention

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