

Project name, IRN	AP23489015 - Investigation of the process of reduction of nickel oxides by hydrogen gas from local nickel ores
Completion date	01.01.2024-31.12.2026
Project supervisor	Yessengaliyev Dauren, PhD, associated professor
Report	<p>Currently, the so-called "green" technology is actively developing in the world by reducing the "carbon impact" of human activity on the environment in the light of the expected global climate change. In connection with this circumstance, the development and implementation of a breakthrough technology for the use of hydrogen as a reducing agent in ferrous metallurgy on an industrial scale will solve a number of significant problems of domestic metallurgy:</p> <ol style="list-style-type: none"> 1. Recycling of complex ores, in particular nickel ores, the use of which is important both for the metallurgical industry of the country and for the Western region, where reserves are concentrated in the Kempirsay group of silicate deposits located in the Aktobe region (more than 400 million tons of nickel ores). 2. Reduction of the environmental burden due to utilization, reduction of carbon dioxide emissions into the atmosphere, pollution from coal mining, coke-chemical, blast furnace, converter, electric steelmaking and ferroalloy production. <p>The project is aimed at obtaining the results of smelting nickel-containing alloys at the expense of local nickel ores and using hydrogen gas as a reducing agent.</p> <p>The local nickel ores belong to the type - oxidized. Oxidized nickel ores have a heterogeneous composition in chemical and mineralogical compositions, ores both in the content of valuable components of nickel, cobalt, rare and precious metals, and in the composition of slag-forming components (oxides of silicon, aluminum, magnesium and iron).</p> <p>The way out of this situation is to conduct research on the development of effective technologies for processing domestic nickel ores. This raises the question of the possibility of creating a production of nickel-containing alloys in Kazakhstan. Therefore, the technology of involving substandard nickel ores, which make up the majority of nickel reserves, in metallurgical conversion, implies the need for research work in this direction.</p>
Purpose	The aim of the project is to study the technology of obtaining a nickel alloy by reducing nickel oxides contained in local nickel ores with hydrogen gas
Expected results	<p>The scope of application and target consumers of each of the expected results may be domestic ferroalloy plants producing nickel alloys or scientific and technical centers presenting similar unresolved problems.</p> <p>As a result of the implementation of scientific and (or) scientific and technical projects, 4 (four) articles 3 (three) of them will be published in peer-reviewed scientific publications on the scientific direction of the project, indexed in the Science Citation Index Expanded and included in 1 (first), 2 (second) and (or) 3 (third) quartile by impact factor in the Web of Science database and (or) having a CiteScore percentile in the Scopus database of at least 60 (sixty) and 1 (one) article or review in a peer-reviewed foreign or domestic publication recommended the Committee Control in the Sphere of Education and Science (CCSES) of the Ministry of High Education and Science of the Republic of Kazakhstan with the</p>

<p>Research group</p>	<p>participation of at least 50% of the members of the research group.</p> <p>Supervisor – Main researcher: Yessengaliyev Dauren, PhD, docent, H index = 4 (Author ID в Scopus – 57211288181; Researcher ID - AAA-9581-2020; ORCID - 0000-0003-0792-0822). https://www.scopus.com/authid/detail.uri?authorId=57211288181</p> <p>Kelamanov Baurzhan, Candidate of Technical Sciences, professor. H index = 9 (Author ID в Scopus – 25655181100; Researcher ID - ABE-5597-2021; ORCID - 0000-0001-7646-9153). https://www.scopus.com/authid/detail.uri?authorId=25655181100</p> <p>Sariev Otegen. Candidate of Technical Sciences, professor. H index = 9 (Author ID в Scopus – 55355882800; Researcher ID - AGH-3529-2022; ORCID - 0000-0003-0745-848X). https://www.scopus.com/authid/detail.uri?authorId=55355882800</p> <p>Abdirashit Assylbek, H index = 5 (Author ID в Scopus – 57218196252; Researcher ID - ABE-5588-2021; ORCID - 0000-0003-0718-3041). https://www.scopus.com/authid/detail.uri?authorId=57218196252</p> <p>Adilov Galymzhan. Masters degree. H index = 1. (Author ID в Scopus – 57213596057; Researcher ID - ABL-6521-2022; ORCID - 0000-0002-1012-8097). https://www.scopus.com/authid/detail.uri?authorId=57213596057</p> <p>Suleimen Bakhyt, Masters degree. H index =4 (Author ID в Scopus – 57215054180; ORCID - 0000-0001-9306-1045). https://www.scopus.com/authid/detail.uri?authorId=57215054180</p> <p>Kosdauletov Nurlybai Masters degree. H index =4 (Author ID в Scopus – 57215058827; ORCID - 0000-0002-1570-4188). https://www.scopus.com/authid/detail.uri?authorId=57215058827</p> <p>Abilberikova Aigerim, doctoral student's</p>
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Publications in scientific publications	