Resource-saving technology of recycling waste vanadium catalyst

Minsk, Belarus
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Year Founded:
2012
Organization type:
hybrid
Project Stage:
Start-Up
Budget:
$250,000 - $500,000

- Ecology
- Waste

Project Summary

Elevator Pitch

Concise Summary: Help us pitch this solution! Provide an explanation within 3-4 short sentences.

A new method of processing vanadium-containing wastes, as well as a way to direct the use of spent vanadium catalysts and products in the building materials industry, which will get ready to commercial products and reduce production costs.

WHAT IF - Inspiration: Write one sentence that describes a way that your project dares to ask, "WHAT IF?"

What if, through waste recycling of vanadium catalysts, we were able to obtain products suitable for further use, the cost of which is 10-100 ti

About Project

Problem: What problem is this project trying to address?

Extraction of vanadium-containing raw materials is a very complex and expensive. Since vanadium is dispersed element in the earth's crust, and the maximum of its content reaches only 0.1-0.2% by weight. The vanadium content in the waste such as spent vanadium catalysts is 5-15%. Recycling of spent vanadium catalysts will reduce the specific investment - by 30-50% when compared with the extraction of vanadium raw materials from the natureenvironme

Solution: What is the proposed solution? Please be specific!

A new method of processing vanadium-containing wastes, as well as a way to direct the use of spent vanadium catalysts and products in the building materials industry, which will get ready to commercial products and reduce production costs.

Impact: How does it Work

Example: Walk us through a specific example(s) of how this solution makes a difference; include its primary activities.

Is established in the electrochemical processing SVC leaching of vanadium compounds previously pulverized or granulated SVC advantageously carried out in a diaphragm electrolytic cell using sulfuric acid electrolyte under certain conditions for 1 hours. The cathode material - iron anode - graphite . Weight of solid in the electrolysis process are reduced by 55% , the degree of leaching of vanadium up to 93%. The content of V2O5 in the resulting product meets the requirements of technical specifications for this reagent. These results allow us to use all the components of the complex SVC and ensure the economic efficiency of their processing .

Impact: What is the impact of the work to date? Also describe the projected future impact for the coming years.

The advantages of the process are complex chemical processing SVC, reducing the amount of reagents used and the flow of energy (at the grinding step is more than 2.5 times) and reduce the leaching time, which is achieved using an ultrasonic treatment to obtain a finely disperse material (50-250 nm). The proposed method can extract up to 98% of the vanadium compounds of SVC with V2O5 content in the finished product up to 87%. The dissolution rate of SVC stage of acid leaching is increased by more than 40 times in comparison with analogues. Solutions obtained from the thermo-hydrolytic release of vanadium compounds are reused at the stage of acid leaching SVC, thus reducing production costs and increase environmental safety. The content of vanadium compounds in the solid residues leaching is 0.3-0.4% by weight., Allowing their use for the production of colored glazes.

Sustainability

Financial Sustainability Plan: What is this solution’s plan to ensure financial sustainability?

Dynamic payback period for is 5 years. Requires coordination with the Ministry of Environment, in order to put in place procedures for the collection of the waste and subsequent supply to the facility for recycling.

Marketplace: Who else is addressing the problem outlined here? How does the proposed project differ from these

approaches?

Researching new technologies for processing of spent catalysts is very important. This issue is receiving a lot of attention around the world. On the basis of an integrated approach and system analysis, a new resource-saving technology for processing waste vanadium catalyst has been proposed.

Team

Founding Story

During elemental analysis of waste containing vanadium, we (E.V. Kryshilovich, I.M. Zharski, S.E. Orekhova, I.I. Kurilo,) noted that spent vanadium catalysts contained the recoverable vanadium. Thus, the idea of creating a new low-cost technology of vanadium oxide (V) of the waste was formed.
