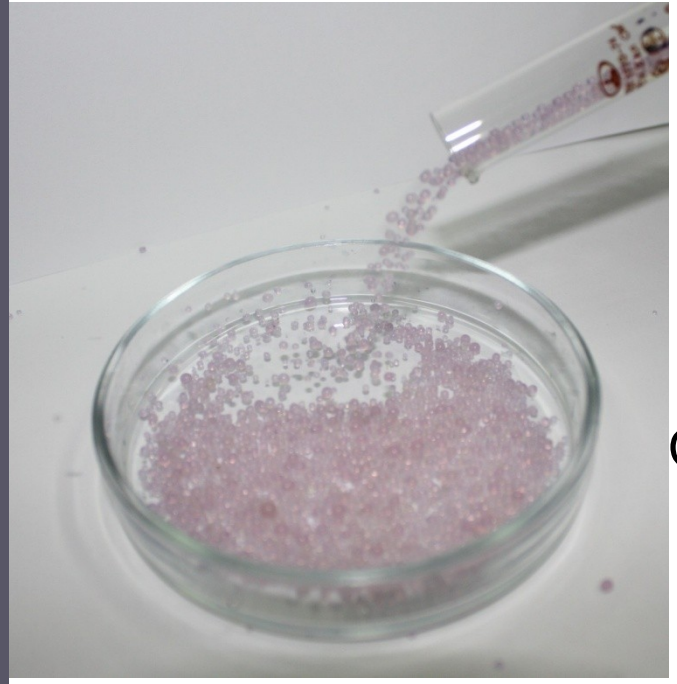


CJSC «Axion – Rare-earth and Noble Metals”

Selective ion-exchange materials AXION for special applications

Company information

CJSC "Axion - RDM" is innovative dynamically growing company involved in the development and further industrial production of advanced Russian ion-exchange materials and technologies of high-yield recovery of rare and precious metals. Company is located in Perm city (Russia) at the site of Perm Chemical Company, LLC and uses its modern development and production facilities.

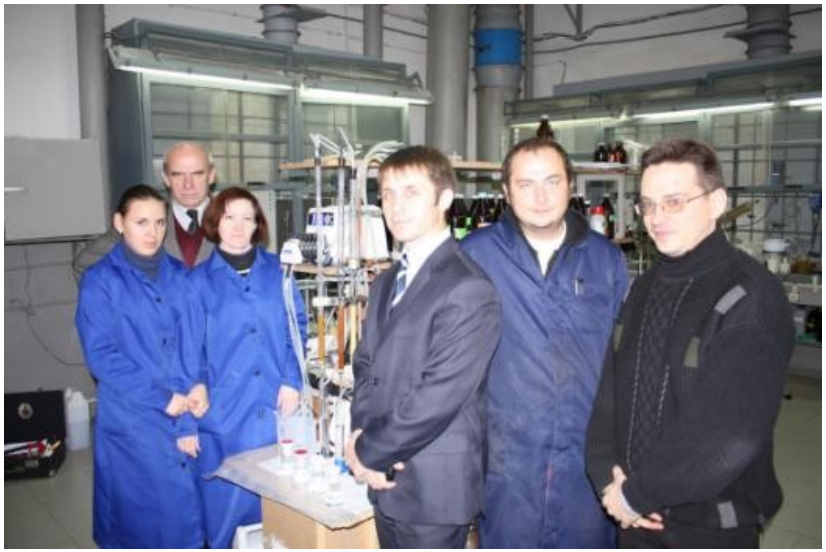
Fields of material application

Mining, Metallurgical And Hydrometallurgical Enterprises

Recovery and concentration of trace quantities of the elements

Recycling of anthropogenic wastes

Atomic Industry



CJSC "Axion-RDM" R&D team

Ion-exchange resin AXION NP-19 for selective recovery of Indium

Adaptive ion-exchange resin AXION NP-19 selective to Indium. According to independent tests results the pilot sample of AXION NP-19 by its capacity (16,6 g/l) and selectivity (70 %) many times exceeds the characteristics of the other industrial ion-exchange resins in sorption from sulfuric solution after Waelz oxides recovering.

Advantages:

1. Single-stage recovery of indium from different solutions, including ones with low concentration of indium (0,1-0,15 g/l) and high concentration of silicic acid (up to 0,9 g/l Si) without their preliminary removal.

2. High sorption efficiency of indium (16,6 g/l);

3. The indium concentration in eluates about 70 % allows to obtain indium concentrate appropriate for further recovery of metallic indium;

4. Possibility of indium selective sorption from solutions with high content of sulfuric acid (up to 150 g/l);

5. No organic impurities (leach, solvent, etc.) both in solutions at the stage of sorption and in eluates at the stage of desorption.

Ion-exchange resin AXION-P6-32 (Eco-10) for the complex Rare Earth Elements (REE) recovery

Ion-exchange resin AXION P6-32 (Eco-10) is intended for selective complex rare earths recovery from solutions.

Advantages:

1. *Total recovery of REE from nitric process liquor (20-30 g/l) with low concentration of REE (0,026 % by Ln_2O_3) and high ammonium nitrate concentration 180 g/l.*
2. *High level of rare earths recovery (at terms of not less than 99,9% sorption prior "breakthrough", purification of 200 (not less) column volumes and resin specific loading about 3,5 volume per hour).*
3. *High total dynamic exchange capacity (PDOE) of pilot sample by REE equals 1105,9 mol/m^3 (3,0 mmol/g).*
4. *Resin is 100 % regenerable and can be used manifold.*

Ion-exchange resin AXION HL for selective recovery complex heavy Rare-earth Elements (HREE)

Ion-exchange resin AXION HL is intended for selective extraction of HREE from high acidity nitric and phosphoric acid solutions without preliminary neutralization.

Advantages:

1. *Total dynamic exchange capacity by HREE is 10 g/kg (0,3 meq/g) at specific loading 2 BV/h from solution with concentration of HNO_3 160 g/l and the concentration of all REE 72 g/l (HREE 2,5 g/l);*
2. *For 1 cycle of sorption desorption of HREE concentrate by 10 times (from 3,3% from total amount of REE in initial solution to 30,6% in eluate);*
3. *The greatest concentrating is observed for Terbium (by 14 times), Dysprosium (by 5 times), Erbium (by 17 times) and Yttrium (by 12 times), and for Ytterbium concentrating jump by 60 times is observed;*
4. *HREE desorb by 2 M solution of ammonium carbonate that prevents possibility of pollution of a concentrate of HREE by impurity of other elements or organic compounds.*

Ion-exchange resin AXION-R(Cs) for selective recovery of Cesium

New adsorbent for Cesium recovery (AXION-R(Cs)) from alkaline solutions is intended for industrial recovery of Cs-137 radionuclide.

Advantages of ion-exchange resin AXION-R(Cs) for Cs-137 recovery from stillage bottoms of Atomic Electro Station:

1. High selectivity to Cs in the presence of Sodium and Potassium Ions (distribution ratio 10^4-10^3), decontamination factor 10^3-10^2.

Sorbent	K_d ^{137}Cs, cm^3/g
Phenol-Resorcin resin (special edition) Russia	$2{,}4\times10^3$
Phenol-Resorcin resin (special edition), templat Russia	882
Phenol-Resorcin resin (special edition) (Rb) Russia	$6{,}0\times10^3$
AXION –R(Cs)	**$1{,}5\times10^4$**
Amberlite XAD 761	232
Phenol-Formaldehyde resin- 1.4/0.7 (NPO “Plastmassy” Nizhny Tagil)	104

2. Cs sorption from strong alkaline solutions (pH>13) and in the presence of organic sequestering agents (Trilone B, oxalate-ion), the current ferrocyanide sorbents do not work in such media.

3. Full Cs desorption from the resin by nitric acid solutions (0,5-1,0 mol/l), total resin regenerating, usage multiplicity.

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