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ХИМИЯ ЖӘНЕ ХИМИЯЛЫҚ ТЕХНОЛОГИЯ БОЙЫНША XI ХАЛЫҚАРАЛЫҚ БІРІМЖАНОВ СЪЕЗДІНІҢ ЕҢБЕКТЕРІ

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Химия және химиялық технология бойынша XI халықаралық Бірімжанов съезінің еңбектері – Алматы, ҚазҰУ 2021 . = Труды XI международного Беремжановского съезда по химии и химической технологии – Алматы, КазНУ 2021. = Proceedings of the 11th International Beremzhanov Congress on Chemistry and Chemical Technology – Almaty, KazNU 2021.

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В книгу включены тезисы докладов, представленных на XI международном Беремжановском съезде по химии и химической технологии, по следующим научным направлениям:

- *Современные проблемы к переработке минерального и техногенного сырья*
- *Фундаментальное и прикладное материаловедение*
- *Органический синтез, переработка растительного и углеводородного сырья*
- *Тренды в современном химическом образовании*
- *Современный химический анализ в промышленности и экологии*
- *Развитие технологии пищевых производств в Казахстане*

Труды съезда могут быть полезны студентам и преподавателям высших учебных заведений, научным работникам, а также работникам химической промышленности.

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SORPTION OF NEODYMIUM AND PRASEODYMIUM WITH CATIONITE PUROLITE 150

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Rare earth elements (REE) are critical metals for the production of neodymium magnets, lithium hydride batteries, fluorescent lamps, etc. They are often used in electronic equipment and devices, which are produced in large quantities. At such rates of technological progress, the amount of electronic waste will grow. Accordingly, the environment will suffer from electronic waste. Therefore, it is very important to recycle these wastes and isolate valuable, rare, and rare earth elements. In our work, we consider the separation of rare earth elements, such as neodymium and praseodymium from neodymium magnets. The resulting metals can be used in the manufacture of batteries, lamps, and gadgets. To do this, we investigated the process of REE sorption under static conditions with the synthetic sorbent Purolite 150.

In other works, the sorption process with different types of Purolite is considered, for example, Purolite S957 [1][2] is often used, as well as Purolite S930 [3], Purolite S940 [3], Purolite S950 [3] and Purolite A-400 [4]. Purolite is a synthetic sorbent, sorption with other synthetic sorbents is considered in the works [5]-[9].

Purolite 150 is a highly acidic cationite that contains a sulfo group (-SO_2OH) and can react as a cation exchanger. In this paper, the sorption of neodymium and praseodymium from magnetic solutions with strong acid cationite Purolite 150 is considered. Optimal sorption parameters at room temperature under static conditions have been studied. The experiment showed that for the extraction of neodymium and praseodymium, the sorption time is 15 minutes (Figure 1).

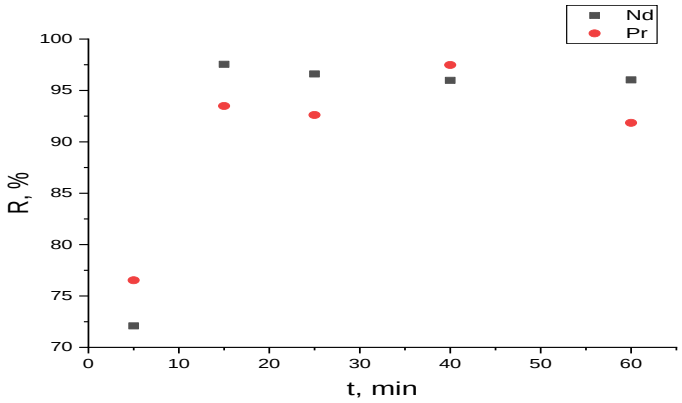

Figure 1. Kinetic curves of the sorption of neodymium and praseodymium by cationite

The sorption efficiency of neodymium is 97.55%, and the praseodymium is 93.49%. The concentration of both metals in the solution is $7 \cdot 10^{-5}$ mol/L.

Table 1 shows the comparative results of metal sorption of our and other works with various types of Purolite sorbent.

Table 1. Comparative results of REE sorption by different types of Purolite sorbent

Sorbent	REE	q_m or R	References
Purolite S957	Ni-MeH batteries, La(III)	0,46±0,023 mmol/g	[1]
Purolite S957		60,75 mg/g	[2]
Purolite S950		99.35%	[3]
Purolite S940		99.25%	[3]
Purolite S930		48.05%	[3]
Purolite 150	Nd-Fe-B magnet, Nd (III), Pr (III)	97,55% Nd, 93,49% Pr	In this work

According to the results of the sorption of neodymium and praseodymium, optimal parameters such as sorption time and pH in a nitrate medium were obtained. In the future, other affecting factors for the separation of metals will be considered. The results obtained can be used to extract REE from electronic waste.

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