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ASSESSMENT OF THE ADSORPTION CAPACITY OF DOUBLE HYDROXIDES OF ALUMINIUM AND LITHIUM DOPED WITH IRON AND ZINC FOR DIRECT LITHIUM EXTRACTION

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Introduction. Lithium and its compounds are extensively utilized across both traditional and advanced technological sectors due to their distinctive physical and chemical characteristics [1]. As the global demand for lithium continues to rise annually, the necessity for increased lithium production becomes more pressing. In nature, over 60% of lithium resources are found in salt lake brine, making it a promising source for extraction [2]. One of the popular methods for obtaining lithium from brines is Direct Lithium Extraction (DLE), which employs sorbents to extract lithium from groundwater.

Body part of the report summary. Sorbents based on double hydroxides of lithium and aluminum represent an effective solution for the extraction of lithium from associated water in oil and gas condensate fields. These compounds possess several significant advantages, including high selectivity for lithium ions and good adsorption capacity, which allows for the efficient separation of lithium from other elements present in the solution and ensures a high yield of lithium during extraction. Additionally, lithium and aluminum double hydroxides are characterized by high stability and durability, making them economically advantageous in the long term. They can also function under various pH and temperature conditions, which broadens their range of applications.

To enhance the adsorption capacity and simplify the desorption process, the hydroxides can be doped with atoms of other metals, such as iron and zinc [3, 4]. For convenience, the inorganic sorbent is placed in a polymer matrix.

The obtained sorbents have been characterized using methods such as infrared spectroscopy, X-ray diffraction, and scanning electron microscopy, while data on adsorption capacity were obtained through ion chromatography.

Conclusions. An analysis of the influence of the dopant elements (Fe, Zn) on the sorption capacity of the lithium-aluminium hydroxide sorbent and desorption process was carried out.

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