

ANALYTICAL STUDY OF THE FEATURES OF OIL SHALE ASH WASTE

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ABSTRACT

Oil shale is the number one energy source in Estonia. The country produces 15 million tons of this brown rock per year. Every year, seven million tons of ash remain after it is burned for energy. Oil shale is a fine-grained black or brown sedimentary rock containing kerogen. Oil shale consists of organic matter, not completely decomposed (up to 70%), and various minerals. Organic matter usually consists of kerogen, which is formed from the decomposition of algae or bacteria.

Oil shale ash (OSA) is composed of several common natural materials such as quartz and carbonate materials and new combustion materials, including clinker minerals, which give the ash useful self-cementing properties. Oil shale ash is not harmful to the environment - it can be used as fertilizer, reduce soil acidity, and be used in the construction industry as a replacement component of minerals.

Until recently, when using OSA, the main focus was on obtaining materials with high strength characteristics. However, the low self-cementing properties of OSA have limited the commercial success of this material. Analysis of the mineralogical composition showed that OSA could be a promising material for use as a barrier material for the immobilization of hazardous materials, retention of heavy metals and radionuclides in its matrix.

Materials used in the handling of hazardous waste must have the following properties: service life, durability, increased radiation protection, and profitability of production.

Heavy metals may be incorporated into hydration products in cement and OSA-based systems or react with other waste components to form sludge.

This is important when attempting to implement a concept for long-term waste management. Including a fine OSA, the fraction can positively affect concrete properties, and a dense structure can improve material properties.

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