Extraction of Thallium, Thorium and Uranium from Estonian phosphorite and phosphogypsum using Aliquat 336

S. Jürjo¹, L. Siinor¹, C. Siimenson¹, P. Paiste² and E. Lust¹

Institute of Chemistry¹, Department of Geology²,

University of Tartu

14A Ravila Street, 50411 Tartu, Estonia

*Corresponding author: silvester.jurjo@ut.ee

Keywords: Thallium, thorium, uranium, Estonian phosphorite, phosphogypsum, liquid extraction, ICP-MS.

Text:

Estonian phosphorite ore contains in addition to lanthanides also a significant amount of radioactive elements as thorium, uranium and toxic thallium. After phosphorite ore processing with sulphuric acid these elements remain mainly into phosphogypsum as radioactive and toxic waste. If these elements are not removed during processing, they will pose environmental threat. [1]

Aliquat 336 efficiency and selectivity is much dependent on pH of the media. In some cases it is possible to take advantage of that phenomenon. Systematic results of tests have shown that in nitric acid media with low pH it is possible to separate exclusively thallium, thorium and uranium from Estonian phosphorite and phosphogypsum with high efficiency. Thus, it is possible to remove significantly radioactive elements before any other downstream process such as saponification for lanthanide extraction. It is also meaningful to investigate further processing possibilities of isolated radioactive elements.

In current work effective processing technologies of Estonian phosphorite and phosphogypsum using different ionic liquids have been investigated.

References: