

APPLICATION OF BAUXITE RESIDUE AS A SECONDARY RAW MATERIAL: RADIOLOGICAL ASPECTS.

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Bauxite residue (BR) is a by-product of aluminum industry, with annual worldwide production around 150 million tons. Right now most of this material is being stored in the form of diluted slurry into land-based ponds or is being dried and stockpiled in landfills. However, according to the new EU raw materials initiative [1], European dependence on the imported raw materials should be reduced, by applying industrial residues as a secondary raw materials. BR is a perfect candidate for reuse in metallurgic and construction industries due to its high content of primary and REE metals.

The screening values set by EU legislation for the amount of radionuclide concentration in materials processed by industries are 1000 Bq/kg for ^{238}U , 1000 Bq/kg for ^{232}Th and 10000 Bq/kg for ^{40}K [2]. Measurements of BR used in the current study show levels of natural radioactivity below the screening values, meaning such material is exempt from any radiological assessments, as it is not likely to cause increased exposure to ionizing radiation to workers or public.

Further valorization of BR by extracting valuable metals may result in higher concentrations of radionuclides in secondary residues, which could exceed the limits, set by EU legislation. The current research presents radiological aspects of iron smelting and leaching of metals from BR, as well as radionuclide concentrations in construction materials (inorganic polymer and mineral wool) produced from BR. The measurements confirm limited applicability of BR in construction industry, as well as possibility of forming NORM residue [2] after BR processing.

References

1. European Commission, “The raw materials initiative — meeting our critical needs for growth and jobs in Europe,” *Commun. from Com. to Eur. Parliam. Council*, p. 13, 2008.
2. European Parliament, “Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation.” *Off J Eur Commun* L13, no. December 2003, pp. 1–73, 2014.



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