

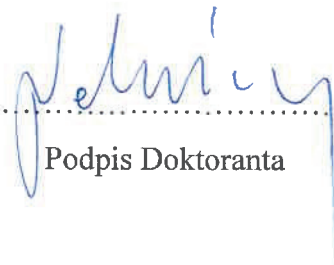
Warszawa, dn. 26.09.2023r.

Grzegorz Nehring  
Autor pracy

Abstract:

This PhD thesis aims to analyze the potential for modifying the process parameters of manufacturing vitrified products from ashes derived from Polish professional power plants in order to enhance their strength parameters and, consequently, increase the economic appeal of the resulting semi-finished products. The primary parameter investigated in this dissertation is the alteration of the cooling rate of molten ash and the addition of glass cullet and/or corundum in various configurations. Ashes from power plants such as "Siekierki", "Jastrzębie-Zdrój" and "Fortum Zabrze" were used in the study. Sample preparation was carried out on specially designed research equipment at the Institute of Power Engineering, while the parametric measurements of the vitrified products were conducted at the Institute of Aviation Technology and Applied Mechanics at the Warsaw University of Technology and in external companies. Liquid slag removal technology at a 1 MWth scale, equipped with a dedicated four-nozzle burner tailored for this technology, was suggested for purposes of industrial manufacturing of the vitrified products. The thesis also includes economic calculations which were used as the basis to prepare a cost-effectiveness analysis of vitrified products manufacturing process based on coal technology involving a power boiler collaborating with a melting chamber.

**Keywords: vitrified product, combustion by-product, ashes, slag, circular economy, power boiler, waste disposal, aggregates, landfills, professional power generation, melting chamber, coal, liquid slag removal.**



.....

Podpis Doktoranta