THE DEVELOPMENT OF FLY ASH – RED MUD BASED GEOPOLYMER

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Abstract

Taking into account environmental considerations, such as decreasing CO_2 emission and the ecological footprint, the utilisation of secondary raw materials is essential for sustainable development. Fly ash is the product of coal combustion plants that is collected by various air cleaning equipment from flue gas, and red mud is the by-product of the Bayer-process, through which alumina can be produced from bauxite. Geopolymerisation is a process that is suitable for the utilisation of such wastes to produce ceramics, cement, concrete etc. with many advantageous properties.

The main objective of the article is to present data on the development and examination of geopolymer made out of deposited fly ash from Tatabánya and red mud from Almásfüzitő.

During the experiments, red mud was added to previously optimised fly ash geopolymer in various quantities and compressive strength tests were carried out to determine the optimal fly ash and red mud ratio. However, as the cracking of the specimens could be observed, further tests were carried out on the durability of the geopolymers. The effect of the sealing conditions and RM calcination was investigated, both via visual inspection and with FT-IR analysis at the ages of 3, 7, 14, 28 and 90 days.

Based on the results, it could be concluded that the sealing conditions have direct effect on the structural characteristics of fly ash – red mud based geopolymers, but further experiments should be carried out for the identification of the ongoing reactions.

Key words: geopolymer, fly ash, FT-IR, red mud

Acknowledgements: The described work/article was carried out as part of the „Sustainable Raw Material Management Thematic Network – RING 2017", EFOP-3.6.2-16-2017-00010 project in the framework of the Széchenyi2020 Program. The realization of this project is supported by the European Union, co-financed by the European Social Fund.