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INFLUENCE OF THE ACIDIC ENVIRONMENT ON THE PROPERTIES OF METAHALLOYSITE GEOPOLYMER COMPOSITES

WPŁYW ŚRODOWISKA KWAŚNEGO NA WŁAŚCIWOŚCI KOMPOZYTÓW GEOPOLIMEROWYCH Z METAHALOIZYTU

Zdzisława Owsiak, Katarzyna Szczykutowicz*
Kielce University of Technology, Poland

Abstract

Geopolymers have been shown to exhibit a significantly higher degree of resistance to corrosive environments when compared with cement concrete. The present paper expounds on the impact of sulphuric, hydrochloric and acetic acid solutions on the durability of mortars with geopolymer binders composed of metahalloysite and alkali activators. An activator with sodium water glass to NaOH solution ratios of 1, 2 and 3 and NaOH solution concentrations of 4, 8 and 12 mol/dm^3 was used. It was found that when increasing sodium water glass content from 1 to 3 in relation to the 8M or 12M NaOH solution in the activator, a significant reduction in the compressive strength of the mortar with this geopolymer binder was obtained after 28 days of exposure to the acid solutions. A smaller decrease in strength occurred with the acetic acid solution than with the sulphuric or hydrochloric acid solutions.

Keywords: geopolymer composite, metahalloysite, acid resistance, sodium activator.

Streszczenie

Geopolimery w porównaniu do betonu cementowego charakteryzują się wysoką odpornością na większość agresywnych środowisk korozyjnych. W artykule przedstawiono wpływ roztworów kwasu siarkowego, solnego i octowego na trwałość zaprawy ze spoiwem geopolimerowym z metahaloizytu oraz aktywatora alkalicznego. Zastosowano aktywator o stosunku szkła wodnego sodowego do roztworu NaOH wynoszącym 1, 2 i 3 oraz stężeniu roztworu NaOH 4, 8 i 12 mol/dm^3. Stwierdzono, że przy zwiększeniu zawartości szkła wodnego od 1 do 3 w stosunku do roztworu 8M lub 12M NaOH w aktywatorze uzyskuje się znaczne zmniejszenie wytrzymałości na ściskanie zaprawy z tym spoiwem geopolimerowym po 28 dniach działania roztworów kwasów. Mniejszy spadek wytrzymałości występował w przypadku roztworu kwasu octowego niż siarkowego lub solnego.

Słowa kluczowe: kompozyt geopolimerowy, metahaloizyt, kwasoodporność, aktywator sodowy.

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*Kielce University of Technology, Poland, e-mail: k.szczykutowicz@tu.kielce.pl

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