FIRE RESISTANT MATERIALS BASED ON ARGILLITE OR METAKAOLIN AS REFRACTORIES GEOPOLYMER

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In the field of habitat or engineering, construction products can play an important role in the development of fire. Nowadays, more and more studies are focused on the search for low-carbon materials without releasing volatile organic compounds. Among the new materials, environmentally friendly aluminosilicate-based geopolymers are promising candidates. This study is part of the determination of formulations of geopolymeric materials for high temperature performance.

Several formulations based on different metakaolins and mineral fillers in the presence of a potassium silicate solution have been evaluated. Different formulations were performed, from cm3 to m3. The temperature resistance was done at 1000 and 1300 °C. Standardized tests (industrial site) allowed to follow the thermal evolution of the material at high temperature. Structural and mechanical analyses were performed before and after the temperature test.

The results show that the selected formulations can achieve a temperature resistance of 1000°C. No loss of mechanical properties was observed during the experiment. This is due to the presence of crystalline phases such as leucite or wollastonite which are formed in-situ whatever the scale transfer. These materials are thus suitable for fire protection and fire resistance applications.