

KAOLINITE/NaOH GEOPOLYMER FOR CONSTRUCTION PURPOSES

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Since some years research is going on in Jordan to produce construction materials, starting from local raw materials. Geopolymers have the benefit that they have a smaller environmental impact than concrete, but also the main raw material, for instance kaolinite, is often locally available. To minimize the production cost, the kaolinite will be used as such and thus not be dehydroxylated.

The aim of this research is to

- find out which local raw materials can be used (reactive and filler)
- optimize the production (composition, curing) of bricks, tiles,.
- find out how to do the production in the field
- make a water reservoir for water harvesting

From several possible Jordanian raw materials, Hiswa clay is chosen. The reactivity of this material towards NaOH and KOH solutions was tested. With kaolinite specimens with compressive strength of 41 MPa under dry conditions and 23 MPa under immersed water conditions were obtained. Since the materials will be used for the construction of water ponds, the durability of these specimens was tested. Thermal analysis is used for several aspects of the fundamental understanding of the production of this material. DSC can be used to study the reactivity, TGA for checking how much kaolinite remains after the geopolymerization.

Also these materials exhibit good mechanical performance upon heating to 600 °C, opening a possibility for use under elevated temperatures.

References

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