



# Academic

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## Use of experimental design in the study of water absorption of ceramic incorporated with red mud

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### Abstract

During the processes of alumina processing, in the Bayer process, an insoluble residue known as red mud is generated. The incorporation of industrial waste in ceramics has been widely used today in the search for alternative raw materials, and also seeking an environmentally correct disposal of waste that pollute. The objective of this work was to use experimental design to study water absorption in ceramic incorporated with red mud. Experimental points were used, whose contents of the materials used varied from 0 to 100%, and the formulations fired at 950°C, the dry density of the raw materials and linear shrinkage of the compositions were also investigated. The green clay and the mixtures containing the highest percentages of the same presented lower values of water absorption and linear shrinkage of firing. The mathematical model that fitted the most was the special cubic. The results obtained in the planning of mixtures show that for the three experimental regions proposed, the special cubic model was the one that most adjusted to the real results, and that this is statistically the best mathematical model and should be used to evaluate the water absorption.

**Keywords:** *Red mud, red ceramic, residue, experimental design*