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CHARACTERIZATION OF CERAMIC SLUDGE AND RECYCLING IN THE CERAMIC TILE

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ABSTRACT

In the 21st century, the efficient use of raw materials and energy has gained importance due to limited natural resources and increased demand for them. Furthermore, it is known that the wastes produced as a result of the use of some industrial raw materials have negative effects on the environment. Recycling of wastes has become even more important in this century due to the factors mentioned above. The use of industrial wastes as a raw material provides both the disposal of wastes and the reduction of raw material utilization. Thus, the materials with high added-value can be produced by recycling of waste. Certain sludge wastes also appear in the ceramic tile production sector. Various ceramic wastes can be produced in the production of ceramic tiles. In this research, some ceramic sludge was identified and analyzed, and then the usability of these wastes was investigated in ceramic tile production in certain ratios. The ceramic sludge was characterized by X-ray fluorescence (XRF) spectroscopy, X-ray diffraction (XRD) spectroscopy, and particle size, respectively. Then the rheological properties (viscosity etc.) of these wastes were determined. The suitable amount of Na_2SiO_3 was investigated for the ceramic sludge. The ceramic tile was prepared with the ceramic sludge and the properties of prepared ceramic tile were determined such as color values (L a b), shrinkage, water absorption, and strength. Moreover, the use of ceramic sludge with various ratios was investigated in the standard production formula of ceramic tile as a raw material. Then, the prepared ceramic tile was analyzed to some properties such as color values (L a b), shrinkage, water absorption, and strength.

Keywords: Recycling, recovery of wastes, recycling of ceramic sludge, ceramic tile.