

MICROWAVE HEATING OF FAST-FIRE FLOOR TILE

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Floor tile is a ceramic material with a compact structure made up of crystalline phases surrounded in a glassy matrix and has many excellent technical characteristics that make possible its use in many different places. Nowadays, research of new heating methods, for example microwave heating, are able to replace the conventional heating (gas-firing) without changing the initial composition of floor tile and quality of the final products. The aim of this work is to study the possibility of the use of microwave heating for manufacturing of fast-fire floor tiles.

Tiles containing of typical fast-fire body formula were prepared by mixtures containing different amounts of clay, ball clay, bentonite and sodium-feldspar. These bodies were heated to 11.9 porosity using a 2.45 GHz, 900 W microwave oven after 16 min heating (from room temperature to 1056 °C) and compared to a natural gas-fired body. The fired samples were characterized by the use of XRD and SEM techniques. The results showed that microwave-heated body contains the same phases (quartz and anorthite ($\text{CaAl}_2\text{Si}_2\text{O}_3$)) with a lower porosity (10.7%) than those of the gas-fired body heated at 1170 °C with a soaking time of 45 min. Scanning electron microscopy showed nearly the same microstructure for both bodies.