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Development of spinel opaque glazes for ceramic tiles

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Abstract

The feasibility of developing fast-firing opaque wall tile glazes obtained from zircon-free frits was studied. The structural and morphological characteristics of the glazes were determined by differential scanning calorimetry, an optical dilatometer, X-ray diffraction and scanning electron microscopy. The studied glaze was characterized by a high whiteness value L^* greater than 94, very low values of a^* and b^* which is about -0.65 and 0.01, respectively, and a high gloss value above 98%. The opaque effect is due to the presence of spinel crystals with a size range of 0.2-1.0 μm , which is formed by devitrification during fast-firing. The Vickers micro-hardness of the studied glaze is higher than the one of the commercial zircon based glass-ceramic glazes. This type of frit can be an alternative one for fabricating opaque ceramic glazes.

Keywords: Microstructure; Fast-firing; Opaque glazes; Spinel

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