

An Investigation into the replacement of Zircon by Fluorspar, Andalusite and Wollastonite as the whitening agent of the body

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Abstract

Unglazed porcelain belongs to the group of tiles with low content of water absorption (less than 0.5 percent). It is extensively and technically used for cladding of outdoor walls and indoor floors. The body is usually decorated by different methods employing various kinds of body pigments. One the important pigment which is highly utilized to whiten the body is Zircon. Zircon is also useful agent to control the shade and shrinkage of the body. However, the price of this strategic imported mineral has increased dramatically in recent years. Therefore, in this study the possibility of replacement of Zircon by fluorspar, Andalusite and Wollastonite were investigated. The shrinkage and water absorption of new bodies were compared to the reference one with the content of 5 wt.% Zircon. Then, the samples were characterized by Colorimeter, Dilatometer and X-ray diffraction methods. The results revealed that the fluorspar cannot be used instead of Zircon because of bloating of sample induced by volatilization of fluorine. Wollastonite has been found as the good whitening agent, but it would increase the water absorption of body which could not be easily modified. However, the sample containing 7 wt.% Andalusite + 3 wt.% Zircon resembles perfectly the properties of reference sample.

Keywords: Porcelain Tiles; Zircon; Colorimeter; Andalusite