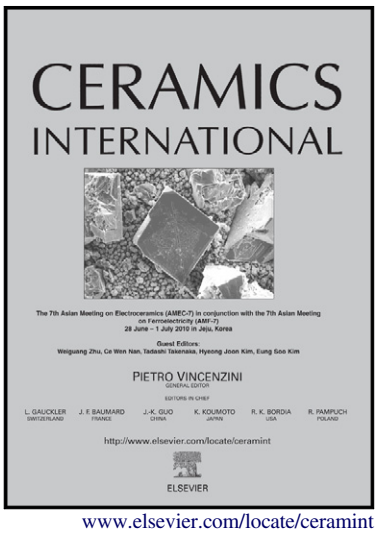

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J. Partyka, M. Gajek, K. Gasek

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Effects of quartz grain size distribution on the structure of porcelain glaze

J. Partyka [1], M. Gajek, K.Gasek ; Faculty of Material Science and Ceramics, Department of Ceramics and Refractories, AGH University of Science and Technology, Cracow, Poland

Abstract

This paper discusses the effects of quartz grain size on the structure of porcelain ceramic glazes. Individual compositions of white opaque ceramic glaze for sanitary ware contained quartz powder of different grain sizes from 8.33 µm to 0.27 µm. The structure of the glazes was analyzed using FTIR spectroscopy, of the phase composition and microscopic imaging using SEM-EDAX and confocal laser scanning microscopy. It was shown that the use of quartz of a very fine grain size increases the degree of disordering of the glaze by increasing the number of non-bridging oxygen atoms.

Key words: A) mechanical alloying, (B) non-bridging oxygen, (D) glaze structure

Introduction

Porcelain ceramic glazes constitute a subgroup of silica glasses. These glazes differ from typical glass mainly in that the content of alumina (Al_2O_3) is higher and the content of network-modifier oxides, such as monovalent alkali metal oxides (e.g., Na_2O, K_2O and Li_2O) or bivalent alkaline earth metal oxides (e.g. CaO, MgO, ZnO, BaO, and SrO), is lower. The composition of ceramic glazes is formulated on the basis of molar compositions in accordance with the methodology developed by Seger and Stuhl [1,2]. When formulating glazes, the oxide

[1]Corresponding author: Janusz Partyka, Faculty of Material Science and Ceramics, Department of Ceramics and Refractories, AGH University of Science and Technology, Cracow, Poland; Phone +48 12 617 3654, e-mail: partyka@agh.edu.pl