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ABSTRACT

" Use of new generation ZnOin place of standard ZnO in ceramic tile production "

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This study was carried out in order to investigate the possible use of "new generation zinc oxide" in ceramic frits. New generation zinc oxide sample was produced by the laboratory upgrading of HZO (Halide bearing Zinc Oxide). HZO concentrate was taken from the recycling of EAFD (Electric Arc Furnace Dust) by using ZincOx's Rotary Hearth Furnace technology. ZincOx's South Korean Rotary Hearth Furnace plant is the largest Asian Electric Arc Furnace Dust recycling facility with a capacity of 200 000 tons per year. First of all; chemical, mineralogical and physical properties of the new generation ZnO and a standard ZnO provided commercially were measured. Then, several transparent and opaque frit formulations containing new generation and commercially available ZnO powders in varying amounts were prepared under laboratory conditions. From these frits, transparent, opaque and matt wall tile glazes were formulated and prepared at laboratory conditions. Glazes were applied to already engobed wall tiles and fired under standard industrial firing conditions. The physical, mineralogical and color properties of the fired bodies were measured. Scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDX) were further employed in order to observe the microstructural and micro chemical characteristics of the fired bodies. The experimental results showed that it was possible to employ a new generation ZnO in the place of commercially available standard ZnO.

Keywords : Zinc oxide, frit, EAFD, ceramic tile.

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