Porcelain Tile Slurries Containing Various Amount of Boric Acid (H_3BO_3) with Improved Rheological Properties

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This study was made in order to increase the Boric Acid (H_3BO_3) ratio in porcelain tile bodies by using a new generation deflocculant. In order to achieve this, standard porcelain tile body formulation with Na-silicate and new generation defloculant were prepared at same sieve residues. The rheology effect of new deflocculant was compared. Another porcelain tile body formulation including boric acid (H_3BO_3) was prepared with Na-silicate and the new generation deflocculant. These two bodies were fired under standard industrial firing regime. The rheology, physical and thermal properties of the fired bodies such as water absorption, breaking strength, linear firing shrinkage, bulk density and linear thermal expansion coefficient were measured. The vitrification behavior of the both bodies were also evaluated using optical dilatometer. Scanning electron microscopy (SEM) was 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 obtain a porcelain tile body including 2 % boric acid with new generation deflocculant and the better rheology, breaking strength and water absorption properties have been achieved compared to standard porcelain body formulation.

Keywords : boric acid, tile body, deffloculant, rheology, ceramic.