Session	Poster Session
Date	NOVEMBER 22, 2019, FRIDAY
Time	10:00 - 11:00
Hall	TOPKAPI FOYER

FEATURES OF THE FORMATION OF LOW-MELTING NON-TRANSPARENT GLASSY COATINGS

Ivan Levitskii
Belarusian State Technological University, Belarus

Glaze coatings are synthesized in the Na2O–K2O–CaO–ZnO–Al2O3–B2O3–ZrO2–SiO2 system with the content of components, wt. %: SiO2 55.0–59.0; B2O3 12.0–16.0; ZnO 4.0–8.0. The remaining oxides were introduced in amount, wt.%: R2O (Na2O + K2O) 8.0; CaO 5.0; Al2O3 6.0; ZrO2 6.0. The variation step was 1.0%. The frits were synthesized in a gas furnace at 1420–1450 ° C for 6 h. Transparent homogeneous frits were formed in the studied system, the crystallization of which established the formation of a crystallization film in the temperature range 610–670 ° C. The melting temperature of granules is 900–950 ° C. Using differential thermal analysis, the presence of an endo-effect at 610–690 ° C, associated with the point of softening of glasses, was established. At 950–995 ° C, an exo-effect due to crystallization processes is observed. The glaze slurry was prepared by grinding the frits to a residue on a № 0056 sieve (10858 holes / cm2) with the addition of 10 wt.% refractory clay. Glaze suspension was sprayed on the surface of ceramics. The coatings were fired in the temperature range 950–1100 ° C in an electric chamber furnace. Coatings are non-transparent and characterized by high levels of whiteness. The main crystalline phase in the coatings is zircon (ZrSiO4). The shine of the coating was 55–80%, whiteness 60–85%. The temperature coefficient of linear expansion of the coating was (50.3–53.2) 10–7 K – 1. The thermal stability of the glaze compositions was in the range of 200–250 ° C. The microhardness of the coatings was 6830–8120 MPa. It was established that high-quality coatings are formed when the content of oxides like ZnO and ZrO2 is in the amount of 10–14 wt.% with the ratio of glass-forming oxides (SiO2 + Al2O3) / (Na2O + K2O) of 6.0–6.4. Studies have established the absence of migration of boron and aluminum ions into model media simulating food liquids.

Keywords: *glaze coatings, crystalline phase, whiteness*