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### **Formulation of glazes for porcelain tiles using a new boron material. Study of the physico-chemical transformations developed during the firing.**

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#### **Abstract**

The aesthetic characteristics and mechanical properties of the new glazes developed for porcelain tiles were determined and compared with other commercial glazes. In the formulation of these new glazes, boron was introduced as a calcined compound. In contrast, the other commercial glazes were made up of a frit (30%) among other constituents, also contained boron. Despite the different chemical and mineralogical characteristics of these glazes, their chemical and mechanical properties, as well as their aesthetic characteristics, were appropriated. When these glazes are formulated for porcelain tile, frit, wollastonite, albite, nepheline, and corundum are generally used as major components. Kaolin, zircon, and zincite, etc. are usually used as minor components in this case, in quantities of less than 10%. The complexity of this type of glaze compositions translates into equally complex behaviour during the firing stage, in which different processes develop at the same time, such as the dissolution of crystalline particles and crystallisation and sintering phenomena. This complexity, together with the few available related studies, makes it extremely difficult to formulate this type of glaze compositions scientifically and efficiently.

The present study examines the physico-chemical transformations that develop during the fast firing of these new glaze compositions for porcelain tile, in which the frit is replaced with a new boron material obtained by calcination, E4972.