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# Modified Sodium Potassium Calcium phosphate glasses

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## Abstract

This work reports on the effect of substituting SiO<sub>2</sub>, B<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub> or Al<sub>2</sub>O<sub>3</sub> for P<sub>2</sub>O<sub>5</sub> in the ternary 0,20 CaO 0,13 K<sub>2</sub>O 0,13 Na<sub>2</sub>O 0,54 B<sub>2</sub>O<sub>3</sub> glass system, compositions being potentially of interest for bio-medical or glass fertilizers applications. Different properties are analyzed here: density, coefficient of thermal expansion, glass transition temperature, thermal stability as well as dissolution behavior in water. It is shown that small addition of Fe<sub>2</sub>O<sub>3</sub> or Al<sub>2</sub>O<sub>3</sub> are both extremely effective in improving the glass resistance toward water degradation, increasing also the glass transition temperature, the density and decreasing the coefficient of thermal expansion. In contrast, addition of SiO<sub>2</sub> and B<sub>2</sub>O<sub>3</sub> have smaller impact on glass resistance toward water, either increasing or slightly increasing it. Non-linear change in density and glass transition with SiO<sub>2</sub> and B<sub>2</sub>O<sub>3</sub> small substitution for P<sub>2</sub>O<sub>5</sub> are also observed.

**Keywords:** bioglass, phosphate glasses, water resistance

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