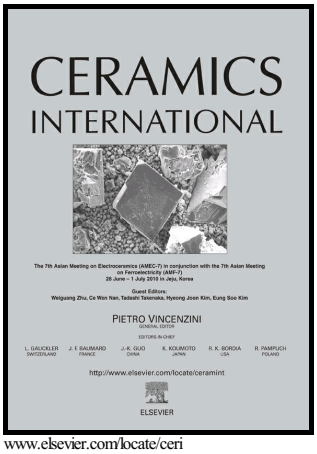

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Effect of iron oxide coloring agent on the sintering behavior of dental yttria-stabilized zirconia

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Abstract

To explore the use of yttria-stabilized zirconia (YSZ) for applications in dentistry, the effect of iron oxide coloring agent on the sintering behavior of YSZ is investigated. Through the use of a small amount of iron nitrate, the color of YSZ can be tailored. The iron nitrate starts to decompose to result in iron oxide, then to dissolve into zirconia grains before the shrinkage is even started. The iron solutes enhance the sintering activity of zirconia in terms of the temperatures at the start of shrinkage and at the maximum shrinkage rate. However, the size of zirconia grains is also increased along with Fe content. More monoclinic phase is found in the specimens with higher Fe content. The formation of m-phase is detrimental to both hardness and toughness of