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## Nucleating agents for devitrite (Na2O.3CaO.6SiO2) glass

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Commercial glasses in the system Na2O-CaO-SiO2, denominated soda-limesilica glasses, have their chemical composition selected as to allow easy melting and fining, low cost, high chemical durability, and to hinder spontaneous devitrification. Generally, the stability against crystallization of such glasses increases by the addition of small quantities of MgO and Al2O3. When uncontrolled glass crystallization occurs, it often leads to the formation of devitrite (Na2O.3CaO.6SiO2) and wollastonite (CaO.SiO2). These two phases present acicular crystals, which could, in principle, increase toughness of the glass-ceramics. In this work we investigated possible nucleating agents for a stoichiometric devitrite glass. The main purpose was to obtain a highly crystallized glass-ceramic with acicular crystals. We tested different oxides and metals, such as P2O5, MoO3, TiO2, ZrO2, W2O3, Nb2O5, AgBr and Pt. The glasses were prepared in a platinum crucible at 1450?C for 3 hours. The glass samples were analyzed by DSC. Heating treatments for nucleation and crystal growth were performed according to a DSC analysis for each composition. The microstructures were evaluated by optical microscopy and the crystalline phases identified by DRX. We found that Pt was an effective nucleating agent leading to the crystallization of devitrite as the main phase. Pt particles were formed already during the melting procedure and induced heterogenous crystallization on their surface during posterior heating treatments. The crystal morphology was dependent on the nucleation temperature. Hardness and indentation toughness (Kc) were measured in the sample with highest crystallized fraction (approximately 70%), and the values were 6.1 MPa and 1.2 MPa.m1/2, respectively. This value of Kc is still small, but represents an increase of about 30% when compared with the Kc of the parent glass.