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Effect of partial crystallization and indentation load in the hardness of a glass in the system SiO₂-Li₂O

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In the present study we investigated the effect of the indentation load and partial crystallization in the Vickers hardness of glasses in the system SiO₂-Li₂O. Glass batches were prepared only with the stoichiometric composition of Li₂Si₂O₅, melted at 1600°C and then crystallized at different temperatures. Samples were grinded, polished and the Vickers hardness tested with indentation loads ranging from 100 to 1000 gF. The hardness slightly increased with the crystallization of the main phase (Li₂Si₂O₅), compared with the original glass. The material hardness seems to be sensible to the application of different indentation loads, with tendency to stabilize at loads above 500 gF. Microscopy was also performed and showed the presence of lithium-disilicate grains with high aspect ratio, as function of the crystallization, pointing to an improvement in fracture toughness.