Chemical strengthening of magnesium doped LAS glass-ceramics

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Abstract

Recently, ion-exchange (IOX) in glasses has found a renewed interest with a lot of new development and research in industrial and academic laboratories along with the commercialization of products with outstanding damage resistance (ie Gorilla glasses).
In some cases, glass-ceramics can present better mechanical properties as compared to glasses due to greater toughness and elastic modulus. In addition, likewise glasses, IOX can further improve the glass-ceramic strength through surface compression build up.

However, there has been little research on this area worldwide. In the past years, Corning investigated chemical strengthening of various glass-ceramic systems. Here, we focus on magnesium rich beta-quartz solid solution after treatment in molten lithium salt. In this approach, the magnesium ions from crystals are replaced by lithium ions from the bath.
Particular emphasis will be given to demonstrate the origins of surface compression following cationic interdiffusion.

Keywords: glass, ceramic, damage resistance, ion, exchange, chemical strengthening

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