

Crack Stability and Fracture Initiation in Chemically Tempered Glass

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Crack stability is usually observed in materials with pronounced R-curve behavior. However, crack stability can also be induced in ion-exchanged glasses by tailoring the residual stress profiles. This idea has led to the development of Engineered Stress Profile (ESP) glasses, and other laminated structures with similar behavior. Robert Cook's contributions to these developments will be described. The high central tension in these glasses also leads to applications where fragmentation upon fracture is needed. The fracture initiation by loading the glasses with a Vicker's indenter is described. By extending the Yoffe-Cook-Pharr analysis of stresses at the indentation site, a qualitative understanding of the load dependence of fracture initiation becomes possible.

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