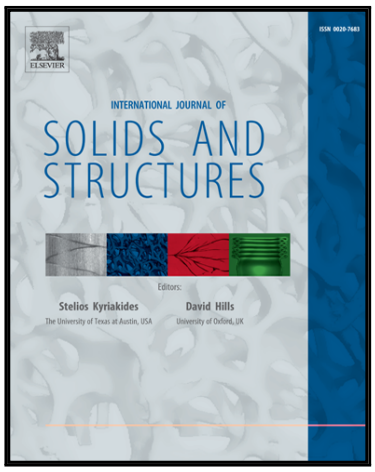

Toughening of thin ceramic plates using bioinspired surface patterns

Idris A. Malik , Francois Barthelat

PII: S0020-7683(16)30164-0
DOI: 10.1016/j.ijsolstr.2016.07.010
Reference: SAS 9227

To appear in: *International Journal of Solids and Structures*

Received date: 22 March 2016
Revised date: 25 June 2016
Accepted date: 6 July 2016

Please cite this article as: Idris A. Malik , Francois Barthelat , Toughening of thin ceramic plates using bioinspired surface patterns, *International Journal of Solids and Structures* (2016), doi: 10.1016/j.ijsolstr.2016.07.010

Highlights

- Laser engraving of narrow trenches on the surface of thin alumina plates can guide the propagation of in-plane cracks
- The apparent toughness of these “interfaces” can be tuned by changing the depth of the trench.
- The overall fracture toughness of the plate can be improved by engraving transverse interfaces or sinusoidal interfaces.
- Complex architectured and mechanisms are possible: bio-inspired sutures resembling an interlocking jigsaw generate high toughness, frictional pull-out, and completely transform the way the material deforms and fails in tension.