THE FRACTURE STRESSES OF A UNI-DIRECTIONAL REIN-FORCED CERAMIC COMPOSITE MATERIAL

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ABSTRACT

A uni-directional fiber-reinforced ceramic composite subject to tensile stress in the fiber direction can undergo extensive matrix cracking normal to the fiber. The fiber-matrix interfacial properties then play a central role on the mechanical property of the ceramic composites. Following the works of Budiansky, Hutchinson and Evans, this paper uses a shear lag model to characterize the mechanical property of the interface in order to predict the fracture stress of the composite for various interfacial bonding conditions. One major difference of this analysis to that of Hutchinson’s is that the shear lag constant provides an extra variable to describe the property of the interface.