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Abstract

The fracture resistance of construction adhesive has attracted tremendous interests in the past decades. This paper conducts an experimental study on the mode I fracture resistance of epoxy construction adhesive reinforced with graphene nanoplatelets (GNPs) through double cantilever beam (DCB) specimens. The experimental results show that the mode I fracture toughness of nanocomposites increases compared with the neat epoxy. It is worth noting that the mode I fracture toughness of nanocomposites at a graphene content of only 0.25 wt% exhibit a 5 times enhancement compared with neat epoxy adhesive. When the graphene content continues to increase, the mode I fracture toughness of adhesive decreases as the aggregation of graphene in adhesive. The mechanical behavior of the DCB specimens with different nanocomposites adhesive are predicted using finite elements analysis (FEA). The mode I fracture properties of nanocomposites obtained from the experimental results are used as cohesive zone model parameters in FEA. The prediction agrees very well with the experimental results.

Keywords: Graphene Epoxy; Fracture Resistance; Numerical Analysis

1. Introduction

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