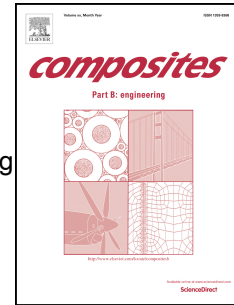


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# An investigation on Mode II fracture toughness enhancement of epoxy adhesive using graphene nanoplatelets

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## Abstract

Epoxy adhesive has a great potential use in different areas which may encounter impact loadings, the fracture behavior of epoxy adhesive needs to be improved to meet the safety requirement. This paper experimentally studies the dynamic mode II fracture toughness of an epoxy adhesive reinforced by different content of graphene nanoplatelets (GNPs) with compliance-based beam method (CBBM). Typical R-curves of the neat epoxy adhesive and nanocomposites with different graphene content under the loading rate of 2m/s are obtained. From the experimental results, the dynamic critical strain energy release rate of nanocomposites increases compared with the value of neat epoxy indicating the effectiveness of graphene on dynamic mode II fracture toughness improvement. The dynamic mode II fracture toughness of nanocomposites reinforced by 0.5wt% GNP exhibit a 41% enhancement compared with neat epoxy adhesive, while no further increase was observed when the nanocomposites loaded the GNP content of 0.75%.

**Key Words:** Mode II fracture toughness; impact condition; graphene nanoplatelets/epoxy adhesive

## 1 Introduction

Epoxy adhesive has been widely used to bond metal components, fiber-reinforced composites (FRP), and concrete structures [1–5]. It has shown many advantages in saving structural weight, reducing stress concentration and corrosions

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