

STRAIN RATE DEPENDENCE OF MECHANICAL PROPERTIES AND FAILURE MECHANISMS OF COMPOSITE MATERIALS

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Abstract

The deformation and failure mechanisms and the measured mechanical properties of metal and polymer matrix composites are known to have strain rate dependence. The mechanisms for strain rate dependence are different in metal and polymer matrix composites because of differences in the constitutive behavior of these materials. This presentation reviews a variety of techniques to obtain the mechanical properties of composite materials at high strain rates. These include the use of visualization tools such as high speed imaging systems for failure studies, dynamics testing for strain rate dependence of mechanical properties, and microstructural aspects of failure features. Available studies are analyzed and critically compared to obtain insight into the structure-property correlations at high strain rates.

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