

Effect of strain rate on the uni-axial stress-strain behavior of highly cross-linked epoxy resin

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The behavior of highly cross-linked epoxy resin subjected to varying strain rates is evaluated under uniaxial tension and compression. Under compression, where deformation is dominated by shear transformation zone-based shear yielding phenomenon, the elastic modulus, yield strength, and percentage softening post yielding increase as strain rate increases. Under tension, where deformation is dominated by local tensile stress-based crazing phenomenon, both the strain at fracture and fracture stress initially decrease up to a strain rate of 0.02 s^{-1} . Hereafter, as the strain rate increases to 0.2 s^{-1} , there is a slight increase in the tensile strain, and the tensile stress reaches the maximum values. This is attributed to a varying dominance of crazing mechanism from disentanglement to chain scission as strain rate is increased.

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