Abstract

The influences of stress ratio (R) on fatigue crack growth (FCG) of thermoset epoxy resin with polyamine hardener were investigated. The linear-elastic fracture mechanics parameter (ΔK and K_{max}) and nonlinear-elastic fracture mechanics parameter (ΔJ) have been used to correlate the FCG rate (da/dN). However, the effects of R on FCG were observed. The K_{max} successfully characterized FCG under cyclic dependent condition (FCG at R = 0.1 and 0.4), but it failed to characterized the FCG under time-dependent condition (FCG at R = 0.7). As a time dependent fracture mechanics parameter, C^* was firstly applied to correlate the time dependent FCG rate (da/dt) of epoxy resin. A good agreement was obtained between time-dependent FCG (R = 0.7) and creep crack growth (CCG) results.

Keywords : epoxy resin, fatigue crack growth, creep effect