9:10 AM - 9:35 AM
Modeling the Non-linear Response of Polymeric Solids Undergoing Microstructural Changes Due to the Diffusion of Solvents

K. R. Rajagopal
Texas A&M University, College Station, Texas, USA

Abstract

The degradation/healing/oxidation of polymeric solids capable of undergoing large deformations due to the diffusion of solvents will be discussed. First, a new and novel class of constitutive models for describing the non-linear elastic and non-linear viscoelastic response of solids will be introduced and then a class of models will be developed for describing the changes in the microstructure, and hence the properties of the polymeric solid, due to the absorption of the diffusing fluid. The governing equations for the problem under consideration, namely a system of coupled partial differential equations or a system of partial differential and integral equations, for the displacement field and the concentration of the diffusing fluid, will be derived and specific initial-boundary value problems of technological significance will be discussed.