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# Microstructural Behaviour of Solder Joints

**Rene L.J.M. Ubachs**, Piet J.G. Schreurs, Marc G.D. Geers

*Eindhoven University of Technology, Eindhoven, The Netherlands*

Mechanical properties of soldered connections, as well as damage initiation and propagation, are strongly influenced by the continuously changing microstructure of the solder. Therefore, in this contribution the microstructure evolution is included in the model by a diffuse interface model that is dependent on a strongly nonlocal parameter. The material behaviour is described by the hyperelasto-viscoplastic Perzyna model. The material parameters are taken to be dependent on the mass fraction. The model has been implemented within a finite element context. A quantitative comparison has been made between two-dimensional simulations and experiments of the static ageing of a eutectic tin-lead solder. A good agreement was found. The mechanical response is shown to be sensitive to the coarseness of the microstructure. Furthermore, stress concentrations develop near interfaces, which are known to be crack initiation sites during fatigue failure.

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