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COMPUTER MODELING OF CREEP DEFORMATION MECHANISM MAPS IN THREE DIMENSION

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Abstract:

Stress, temperature and grain size are the three significant parameters which govern different modes for creep deformation. Generally two dimensional maps are used to delineate parameter regions which lead to different types of creep deformation; third parameter is considered as constant. In this paper, all three parameters are considered as variables, and the boundaries, which separate different creep mechanisms, are presented in three dimensional space. Matlab software is used to draw these maps. Pure aluminum, at higher temperatures is used as a prototype example, and theoretical boundaries are drawn for the Harper-Dorn, Power law, Nabarro-Herring, Coble models of creep deformation. Logarithmic scales are used for the normalized stress and grain size, whereas a reversed linear scale is used for the normalized temperature. This choice of scale simplifies the shape of parameter region.

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