PACKAGE ID - 001282SUN0000 ILAG

KWIC TITLE - Intermetallic Layers in Soldered Joints

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LIMITATION CODE -COPY **AUDIENCE CODE -** LIM

COMPLETION DATE - 09/01/1994 **PUBLICATION DATE -** 11/01/1994

DESCRIPTION - ILAG solves the one-dimensional partial differential equations describing the multiphase, multicomponent, solid-state diffusion-controlled growth of intermetallic layers in soldered joints. This software provides an analysis capability for materials researchers to examine intermetallic growth mechanisms in a wide variety of defense and commercial applications involving both traditional and advanced materials. ILAG calculates the interface positions of the layers, as well as the spatial distribution of constituent mass fractions, and outputs the results at user-prescribed simulation times.

PACKAGE CONTENTS - Media Directory; Software Abstract; SAND94-0691; Media Includes Source Code, Executable Module, Compilation Instructions, Linking Instructions, Sample Probelm Input and Output Data;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 3.5 Diskette

METHOD OF SOLUTION - The resulting system of material balance and interface displacement equations are solved by the method of lines which uncouples the spatial and temporal discreziation of the partial differential equations. Here, the spatial discretization is represented using a finite difference approximation, which results in a set of coupled, first-order, ordinary differential equations (ODE) in time. These are solved in turn by an efficient library ODE solver, DEBDF, that determines internally the time step required to maintain stability. This implementation based on that of Baer, includes an adaptive meshing scheme to adequately resolve steep mass fraction gradients.

COMPUTER - SUN

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OPERATING SYSTEMS - SUN, Solaris

PROGRAMMING LANGUAGES - FORTRAN 77

SOFTWARE LIMITATIONS - Default parameters allow a maximum of five layers, or zones (maxizone), and three components (maxcomp) with a maximum of 1500 nodal points (maxnpt) of which up to 1300 may appear in one zone (maxnpt0). These parameters are changeable by the user.

SOURCE CODE AVAILABLE (Y/N) - Y

RELATED SOFTWARE - ILAG is based on M.R. Baer's implementation of the method of lines fro solving the reactive diffusion equations associated with thermal ignition of energetic materials and includes an adaptive meshing scheme by R.E. Benner. The ODE solver employed, DDEBDF (Shampine and Watts, Hindmarsh), is part of the SLATEC library.

HARDWARE REQS - In its default configuration, the executable requires approximately 185 kB of storage. The size of the ASCII output files depends on the problem and output specifications.

REFERENCES - K.L. Erickson, P.L. Hopkins, and P.T. Vianco, Analysis of Physiochemical Processes During Solder Aging, SAND94-0691, 11/01/1994.

ABSTRACT STATUS - Released AS-IS 2/9/1999.

SUBJECT CLASS CODE - Q

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
I CODES
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EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/DP

PACKAGE TYPE - AS - IS