PACKAGE ID - 001185UNIXW00 PROTEUS

KWIC TITLE - Fortran Program to Solve 2-D Continuum Equations for Chemically Reacting Plasma

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

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DESCRIPTION - PROTEUS is a FORTRAN program that solves 2-d continuum equations for chemically reacting plasma flow including electron, ion, and neutral transport, plasma generation, and plasma-surface kinetics, for modeling inductively coupled plasma reactors. PROTEUS

PACKAGE ID - 001185UNIXW00 PROTEUS

DESCRIPTION -(CONT) consists of three primary modules: a charged species transport module, a neutral species transport module, and an electromagnetic field solver module. these modules are referred to as INDUCT, CURRENT, and ORMAX, respectively. The modules are all written in FORTRAN and have been designed for and tested on UNIX workstations. PROTEUS also includes interfaces to CHEMKIN III and SURFACE CHEMKIN III for general descriptions of plasma and surface kinetics.

PACKAGE CONTENTS - Media Directory; Software Abstract; User's Manual; Media Includes Source Code, Compilation Instructions, Linking Instructions, Sample Problem Input Data;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - PROTEUS couples neutral and charged species transport through iteration between the INDUCT and CURRENT modules. The spatially resolved power deposition into the plasma is determined in the ORMAX module, called by the INDUCT routine.

COMPUTER - UNIX WORKSTATIN

OPERATING SYSTEMS - UNIX

PROGRAMMING LANGUAGES - FORTRAN

SOFTWARE LIMITATIONS - Typically requires more than 100MB RAM.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - PROTEUS includes the effects of neutral depletion and etch-product loading in a plasma simulation, which are important in determining etch uniformity in plasma etch reactors for the microelectronics industry. The interface to CHEMKIN III, SURFACE CHEMKIN III, and the CHEMKIN TRANSPORT packages provides a unique capability for specifying general reaction kinetics and allows the user to apply the model to unlimited chemistry sets.

RELATED SOFTWARE - PROTEUS uses CHEMKIN III, SURFACE CHEMKIN III and the CHEMKIN TRANSPORT packages for describing general kinetics and transport properties. In addition, the module components CURRENT, INDUCT, and ORMAX are each available as stand-alone codes. PROTEUS is also set up to use the Sandia ANTIPASTO mesh generator for describing the reactor geometry and mesh.

OTHER PROG/OPER SYS INFO - Requires a FORTRAN compiler. Use of a mesh generator other than ANTIPASTO would require programming of new mesh-generator interfaces by the user. PROTEUS creates output files compatible with the commercially available TECPLOT post-processing

PACKAGE ID - 001185UNIXW00 PROTEUS

OTHER PROG/OPER SYS INFO -(CONT) software.

HARDWARE REQS - UNIX workstation. 150 MB RAM

TIME REQUIREMENTS - Run time requirements depend highly on computer load and size of the chemistry set. A complex geometry and 6-component chemistry set typically takes several days on a 166Mhz workstation to reach steady state.

REFERENCES - Ellen Meeks and Aili Ting, PROTEUS: Plasma Reactor Overall-Transport Engineering-Use Simulator, Preliminary Report, February 1996.

ABSTRACT STATUS - Submitted 8/13/97. Released AS-IS 10/27/97

SUBJECT CLASS CODE - FHKTUW

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
P CODES
REACTOR KINETICS
REACTORS
COMPUTERIZED SIMULATION
REACTOR PHYSICS
HYDRODYNAMICS
THERMODYNAMICS
TIME DEPENDENCE
FLUID FLOW
HEAT TRANSFER
TRANSIENTS
SYSTEMS ANALYSIS
CHEMICAL REACTION KINETICS

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/DP

PACKAGE TYPE - AS - IS