PACKAGE ID - 001306IBMPC00 AADVISOR

KWIC TITLE - Analyzes Data from Semiconductor Wafers

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

COMPLETION DATE - 11/01/1998 **PUBLICATION DATE -** 11/01/1998

DESCRIPTION - This program analyzes reflectance data from semiconductor wafers taken during the deposition or evolution of a thin film, typically via chemical vapor deposition (CVD) or molecular beam epitaxy (MBE). It is used to determine the growth rate and optical constants of the deposited thin films using a virtual interface concept. Growth rates and optical constants of multiple-layer structures is possible by selecting appropriate sections in the reflectance vs time waveform. No prior information or estimates of growth rates and materials properties is required if an absolute reflectance waveform is used. If the optical constants of a thin film are known, then the growth rate may be extracted from a relative reflectance data set. The analysis is valid for either s or p polarized light at any incidence angle and wavelength. The analysis package is contained within an easy-to-use graphical user interface.

PACKAGE CONTENTS - Media Directory; Media Includes User's Guide, Executables, Sample Problem Input Data, Installation Instructions;

SOURCE CODE INCLUDED? - No

MEDIA QUANTITY - 2 3.5 Diskettes

METHOD OF SOLUTION - The program is based on the algorithm described in the folowing two publications: W.G. Breiland and K.P. Killeen, J. Appl Phys. 78 (1995) 6726, and W.G. Breiland, H.Q. Hou, B.E. Hammons, and J.F. Klem, Proc. XXVIII SOTAPOCS Symp Electrochem. Soc. San Diego, May 3-8 1998. It relies on the fact that any multiple-layer system has a reflectance spectrum that is mathematically equivalent to a single-layer thin film on a virtual substrate. The program fits the experimental reflectance vs time data to an exact expression for the thin film reflectance with five adjustable parameters: 1) growth rate, 2) real part of complex refractive index, 3) imaginary part of refractive index, 4) amplitude of virtual interface reflectance, 5) phase of virtual interface reflectance.

COMPUTER - IBM PC

OPERATING SYSTEMS - Windows 95/98 Windows NT 4.0

PROGRAMMING LANGUAGES - na

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SOFTWARE LIMITATIONS - Analyzes waveforms with a maximum of 65536 data points. Source code is contained within a project to be compiled under National Instruments Labwindows CVI software development package. Standalone versions may be distributed without license fees paid to National Instruments, but source code will require the Labwindows Cvi package to enable it to be compiled and run.

SOURCE CODE AVAILABLE (Y/N) - N

RELATED SOFTWARE - Can analyze data taken with Sandia Corporation Monogrow software, or any other instrument software that records a real-time, in situ measurement of absolute reflectance vs time.

HARDWARE REQS - An IBM compatible PC with enough memory to run Windos 95/98 or Windows NT 4.0 and a monitor with 640 x 800 resolution.

ABSTRACT STATUS - Released AS-IS 10/6/1999

SUBJECT CLASS CODE - Q

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
A CODES
PHYSICAL PROPERTIES

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/DP

PACKAGE TYPE - AS - IS