PACKAGE ID - 000566IBMPC00 ALPHN

KWIC TITLE - Calculates Neutron Production in Canisters of High-level Waste

AUTHORS - Salmon, R.
Oak Ridge National Lab., TN (United States)

Hermann, O.W.
Oak Ridge National Lab., TN (United States)

LIMITATION CODE -UNL **AUDIENCE CODE -** UNL

COMPLETION DATE - 01/15/1993 **PUBLICATION DATE -** 10/01/1992

DESCRIPTION - ALPHN calculates the (alpha,n) neutron production rate of a canister of vitrified high-level waste. The user supplies the chemical composition of the glass or glass-ceramic and the curies of the alpha-emitting actinides present. The output of the program gives the (alpha,n) neutron production of each actinide in neutrons per second and the total for the canister. The (alpha,n) neutron production rates are source terms only; that is, they are production rates within the glass and do not take into account the shielding effect of the glass. For a given glass composition, the user can calculate up to eight cases simultaneously; these cases are based on the same glass composition but contain different quantities of actinides per canister.

PACKAGE CONTENTS - Media Directory; Software Abstract; ORNL/TM-12239; Media Includes Source, Executable, Sample Problem Input and Output;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 5.25 Diskette

METHOD OF SOLUTION - ALPHN is written in FORTRAN for use with a personal computer. It calculates the neutron production rate in a mixture of chemical species recieving alpha particles from alpha emitting actinides. The user specifies the mass fractions of the chemical species in the mixture and the curies of each actinide. Other basic data (stopping powers and thick-target yields) are supplied by the data library diskette of the program. The program uses the method developed by D. West (1979).

COMPUTER - IBM PC

OPERATING SYSTEMS - MS DOS

PROGRAMMING LANGUAGES - FORTRAN IV

SOFTWARE LIMITATIONS - Calculates up to 47 actinides, 42 chemical species, and 8 decay times.

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SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - The program is run on a personal computer. It can run up to 8 cases (8 decay times) in one run. Data on alpha energies, stopping powers, and thick-target yields are provided on the data diskette.

RELATED SOFTWARE - O.W. Hermann and R.M. Westfall, ORIGEN-S:SCALE System Module to Calculate Fuel Depletion, Actinide Transmutations, Fission Product Buildup and Decay, and Associated Radiation Source Terms, as described in Sect. F7 of SCALE: A Modular Code System for Performing Standardized Computer Analyses for Liscensing Evaluation, NUREG/CR0200, Rev.4 (ORNL/NUREG/CSD-2/R4) VOL. II (draft), February 1990.

HARDWARE REQS - 175,000 bytes RAM.

TIME REQUIREMENTS - Execution time: 30 seconds (approx).

REFERENCES - Royes Salmon and O.W. Hermann, ALPHN: A Computer Program for Calculating (alpha,n) Neutron Production in Canisters of High-Level Waste, ORNL/TM-12239, October 1992.

ABSTRACT STATUS - Submitted February 1993. ESTSC sucessfully screened March 1, 1993.

SUBJECT CLASS CODE - GJW

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
A CODES
HIGH-LEVEL RADIOACTIVE WASTES
NUCLEAR REACTION YIELD
ALPHA REACTIONS
NEUTRON EMISSION

EDB SUBJECT CATEGORIES -
990200 663440 663610

SPONSOR - DOE/RW

PACKAGE TYPE - SCREENED