

PACKAGE ID - 000134IBMPC00 MGA8

KWIC TITLE - Plutonium Isotopic Gamma-Ray Analysis

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

COMPLETION DATE - 06/01/1991 **PUBLICATION DATE** - 01/24/1992

DESCRIPTION - The MGA8 (Multiple Group Analysis) program determines the relative abundances of plutonium and other actinide isotopes in different materials. The program analyzes spectra taken of such samples using a 4096-channel germanium (Ge) gamma-ray spectrometer. The code can be run in a one or two detector mode. The first spectrum, which is required and must be taken at a gain of 0.075 Kev/channel with a high resolution planar detector, contains the 0-300 Kev energy region. The second spectrum, which is optional, must be taken at a gain of 0.25 Kev/channel; it becomes important when analyzing high burnup samples (concentration of Pu241 greater than one percent). Isotopic analysis precisions of one percent or better can be obtained, and no calibrations are required. The system also measures the abundances of U235, U238, Np237, and Am241. A special calibration option is available to perform a one-time peak-shape characterization when first using a new detector system.

PACKAGE CONTENTS - Media Directory; Software Abstract; UCRL-LR-103220, Vols. 1 and 2; Media Includes Source, Executable Image, Object Modules, Object Library, Binary Sample Problem Data, Auxiliary Information, and Control Information;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 3.5 Diskette

METHOD OF SOLUTION - The basic method for determining the relative abundance of the isotopes of plutonium is to measure the intensity of two or more peaks from gamma rays of similar energy, but arising from different isotopes. Since the gamma-ray emission probabilities and half-lives are known, the atom ratios can be calculated provided relative detection efficiencies for the peaks can be estimated.

COMPUTER - IBM PC

OPERATING SYSTEMS - MS DOS

PROGRAMMING LANGUAGES - FORTRAN 77

SOURCE CODE AVAILABLE (Y/N) - Y

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TIME REQUIREMENTS - Analysis time is less than one minute.

REFERENCES - R. Gunnink, MGA: A Gamma-Ray Spectrum Analysis Code for Determining Plutonium Isotopic Abundances, Volume 1, Methods and Algorithms, UCRL-LR-103220, Vol. 1, April 3, 1990; R. Gunnink and W.D. Ruhter, MGA: A Gamma-Ray Spectrum Analysis Code for Determining Plutonium Isotopic Abundances, Volume 2, A Guide to Using MGA, UCRL-LR-103220, Vol. 2, September 1990\ Ray Gunnink, MGA2: A One-Detector Code for Rapid High-Precision Plutonium Measurements, UCRL-96016 Rev. 1, Preprint, July 1987.

ABSTRACT STATUS - Abstract first distributed December 1989. IBM PC version submitted April 1991.

SUBJECT CLASS CODE - U

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
M CODES
PLUTONIUM
ELEMENT ABUNDANCE
ACTINIDE ISOTOPES
GAMMA SPECTRA
GAMMA SPECTROMETERS
ISOTOPE RATIO

EDB SUBJECT CATEGORIES -
990200 400102

SPONSOR - DOE/DP

PACKAGE TYPE - SCREENED