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Contribution to Neutron Nuclear Data Evaluation Newsletter-35

Japanese Nuclear Data Committee
(Nuclear Data Center, JAERI)

Work Recently Completed and Publications:

(i) Theoretical Calculation of Decay Data of Short-Lived Nuclides for JNDC FP Decay Data File
T. Yoshida

(JAERI-M 83-127(1983))

It is one of unique features of the JNDC FP Decay Data File that theoretical values of $\bar{E}_\beta$ and $\bar{E}_\gamma$, average beta- and gamma-ray energies, are fully adopted for short-lived nuclides. Here, details of the theoretical estimation method of $\bar{E}_\beta$ and $\bar{E}_\gamma$ based on 'gross theory' of beta-decay are described and the numerical tables of the estimated decay data for short-lived nuclides are presented. Further, discussion is made for justification of adoption of the theoretical values instead of values derived from decay schemes from the viewpoint of the energy profile of the beta-strength function.

(ii) JNDC Nuclear Data Library of Fission Products
Kanji Tasaka, Hitoshi Ihara, Masatsugu Akiyama
Tadashi Yoshida, Zyun-itiro Matumoto and Ryuzo Nakasima

(JAERI 1287(1983))

The JNDC nuclear data library for 1172 fission products is released. The gross theory of beta decay has been used extensively for estimating unknown decay data and also some of known decay data with poor accuracy. The calculated decay powers of fission products using the present library show excellent agreement with the latest measurements at ORNL (Oak Ridge National Laboratory), LANL (Los Alamos National Laboratory) and UTT (University of Tokyo, Tokai) for cooling times shorter than 10^3s after irradiation. The decay power of fission products has been calculated for ten fission types and the results have been fitted by an analytical function with 31 exponentials. This permits the easy application of the present results of decay power calculations to a LOCA (Loss-of-Coolant Accident) analysis of a light water reactor and so on.

Work in Progress:

(i) Neutron nuclear data of ^{6}Li and ^{7}Li are evaluated in the energy range from 10^{-5} eV to 20 MeV. Two discrete levels are taken into account for the inelastic scattering on both nuclei.

(from K. Shibata, JAERI)

(ii) Evaluation of neutron nuclear data for ^{16}O is in progress. The total cross section below 3 MeV is calculated on the basis of the R-matrix theory. The inelastic scattering cross section is estimated from experimental data and the statistical model calculation.

(from K. Shibata, JAERI)

(iii) Neutron nuclear data of ^{248}Cm and ^{249}Cm are evaluated. Evaluated quantities are the total, elastic and inelastic scattering, fission, capture, (n,2n), (n,3n) and (n,4n) reaction cross sections, the resolved and unresolved

resonance parameters, the angular and energy distributions of the emitted neutrons, and the average number of neutrons emitted per fission.

(from Y. Kikuchi, JAERI)

Nuclear Model Code:

(i) A new computer code for calculation of neutron inelastic scattering cross sections has been developed. It combines the coupled-channel and statistical models in a consistent manner by employing Satchler's generalized transmission coefficient. Sensitivity of calculated quantities to potential parameters and assumed coupling schemes has been studied. This method has been applied to the analyses of inelastic scattering on actinide nuclei.

(from T. Ohsawa, KYU)

Work Planned for the Near Future:

(i) Evaluation of neutron nuclear data for ^{9}Be is planned in the energy range from 10^{-5} eV to 20 MeV.

(from K. Shibata, JAERI)

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