分裂片の非等方性，分裂片の質量分布，分裂片の運動エネルギーなど。

低エネルギーで2つの核分裂モード（超流動遅動と粘性効果）がある。

話　題（その Ⅲ）

N N D E N への投稿

五十嵐信一（原研）

 J N D C ニュース№.31 の「おしらせ」でN N D E N への協力についてお願いを書きましたが，

その時N N D E N－15 に出した原稿を例として掲載しました。これは例としてだけでなく，国内

での中性子データ評価の現状を知るのに役立つと思われますので，今後以下のようにN N D E N へ

の原稿は継続的に J N D C ニュースに掲載することに致します。なお，以下のうちN N D E N－

16 へのものは時期的には前号に掲載すべきものであります。

Contribution to Neutron Nuclear Data Evaluation Newsletter-16

Japanese Nuclear Data Committee
(Nuclear Data Laboratory, JAERI)

Work recently completed and publications:

    Evaluation of Fission Product Nuclear Data for 28 Nuclides.
      S. Igarasi, S. Iijima, M. Kawai, T. Nakagawa, Y. Kikuchi,
      K. Maki and H. Matsunobu.
      (to be submitted to Conference on Nuclear Cross Sections and
      Technology, to be held at Washington, D.C., March 1975)

        Evaluation of 28 fission product nuclear data for fast reactors
    is performed for total, capture, elastic scattering and inelastic
    scattering cross sections up to 15.0 MeV. Resonance parameters as
    well as the data of resonance integrals are surveyed. The cross
    sections reproduced with these parameters are adjusted so as to fit
    the thermal cross sections and to join smoothly with the cross sections
    obtained by the statistical model calculations which are performed
    taking account of the level-width fluctuation and resonance-resonance
    interference. For some nuclides whose resonance parameters are not
    experimentally obtained yet, the statistical model calculations are
    carried out down to fairly low energy point and the cross-section
    values thus obtained are used as the expectation values of the averaged
    cross sections in the resonance region.

Work in progress:

 i)   Review works on resonance parameters of ^{235}U, ^{238}U, ^{239}Pu and
    ^{240}Pu are in progress in a working group of JNDC. A review report

on the resonance parameters of ^{239}Pu by T. Yoshida(NAIG) was submitted for publication in JAERI-M Report with the title of "Compilation of ^{239}Pu Resonance Parameters". Review works for the resonance parameters of ^{235}U, ^{238}U and ^{240}Pu are at the final stage. In these reports only experimental data are compiled. (informed by A. Asami)

ii)   Evaluation of α and ν_p values for ^{235}U has been performed by H. Matsunobu, on the basis of the experimental data compiled up to date. The α value is evaluated in the energy range 1 keV to 1.1 MeV, and the capture cross section is derived from this α value and the fission cross section evaluated previously. The ν_p value is evaluated in the energy range 40 keV to 15 MeV, and the energy dependence of the evaluated data is expressed by three linear functions with different gradients, respectively. These functions are joined at 2 MeV and 7.5 MeV. Calculation of the capture cross section for ^{235}U in the energy range above 1 MeV is also performed by H. Matsunobu, using CASTHY-code developed by S. Igarasi(JAERI). The optical potential parameters are determined on the basis of the experimental data on total cross section of ^{235}U, and the calculated capture cross section is normalized to a value derived from the evaluated α value in the energy range below 1 MeV.

iii) Evaluation of the Cross Sections for ^{232}Th
      M. Ohta, T. Ohsawa and Y. Kawamura (Kyushu Univ.)

        Calculation of the cross sections for inelastic scattering, radiative capture and (n,2n) reactions for ^{232}Th has been carried out in the energy range from 10 keV to 10 MeV, on the basis of statistical model. Comparison between calculated inelastic scattering cross section and evaluated value of ENDF/B-IV shows that the present calculation underestimates the value at most by 40%.

iv) Evaluation of Neutron Capture Cross Section for ^{239}Np
      M. Ohta, T. Ohsawa, Y. Kawamura and H. Irie (Kyushu Univ.)

        Statistical model calculation of neutron capture cross section for ^{239}Np has been made in the energy range from 10 keV to 2.5 MeV with width-fluctuation and resonance-interference effects. The calculated value is normalized at 20 keV to the data of G.I. Bell.

Work planned for the near future:

        Compilation of the nuclear data for Ni, Fe, Cr, Ta, O and Na isotopes is started by some members of JNDC. Evaluation of these nuclear data will be commenced, after completion of the compilation, in near future.

        S. Igarasi
Nuclear Data Laboratory
Tokai Research Establishment
Japan Atomic Energy Research Institute
Tokai-mura, Naka-gun, Ibaraki-ken, Japan

        February 7, 1975 $-42-$

Contribution to Neutron Nuclear Data Evaluation Newsletter-17

Japanese Nuclear Data Committee
(Nuclear Data Laboratory, JAERI)

Work recently completed and publications:

i) Compilation of ^{239}Pu Resonance Parameters
   T. Yoshida(NAIG), JAERI-M 5979 (1975)

   As a part of the evaluation work by a working group of the
Japanese Nuclear Data Committee, ^{239}Pu neutron cross sections are
being evaluated at present. This is an interim report of the work,
and collected data of the Breit-Wigner single-level parameters for
^{239}Pu resonances are compiled in tables with a summary of the
relevant experimental informations. The multilevel parameters are
also given in the Appendix.

ii) Proceedings of the EANDC Topical Discussion on "Critique of Nuclear
    Models and Their Validity in the Evaluation of Nuclear Data"
    Editor: T. Fuketa, JAERI-M 5984 (1975)

    The topical discussion meeting was held on March 27, 1974
in the middle of the 17th meeting of the European-American
Nuclear Data Committee (EANDC)* from March 25 through 29, 1974
at Akasaka Prince Hotel, Tokyo. The topical discussion meeting
was organized jointly by JAERI and Japanese Nuclear Data Committee.
About 70 researchers including the attendants of the EANDC meeting
participated in the discussion.
    The proceedings consist of 18 papers and the records of
discussion prepared later by each speaker. Most of the papers
are kept intact by photo-offsetting the manuscripts; the editorial
arrangement was intended to be minimal.
    *now Nuclear Energy Agency Nuclear Data Committee (NEANDC)

iii) Modified Methods of Neutron Cross-Section Calculations
     S. Igarasi, J. Nucl. Sci. Tech. 12 67 (1975)

     Conventional formulas of the neutron cross sections based on
the statistical model are modified so as to keep equality between
the total cross section and the sum of the partial cross sections
by taking into account the effects of the cascade process accompanied
by the emission of γ-rays from the compound nuclear states, and of
other processes which compete with the neutron scattering and capture.
The modifications are applied to the cross-section formulas with
width-fluctuation correction and resonance-resonance interference,
according to the statistical distribution law of the level widths
and spacings, respectively. Examples of calculations are shown for
^{238}U, ^{109}Ag, ^{103}Rh, and ^{90}Sr. Discussions are given concerning the
contributions of the cascade process, the competing processes, the
width-fluctuation and resonance-interference effects.

Work in progress:

i)   Compilations of the resonance parameters of ^{235}U, ^{238}U, and ^{240}Pu are in progress by a working group of JNDC. In these works only experimental data are compiled with a brief description of the experimental conditions. Comparison of some parameters will also be made. (informed by A. Asami)

ii)   Evaluation of ^{240}Pu fast neutron cross sections has been made in the energy range 1 keV to 15 MeV. For total, elastic scattering, (n,2n) and (n,3n) cross sections, Kanda's evaluated values for ^{238}U are referred to, in order to obtain those for ^{240}Pu theoretically. Fission cross section is evaluated on the basis of renormalized experimental data and a simple model calculation ($E_n \gtrsim 5$ MeV). Capture cross section is calculated with CASTHY code and normalized to the experimental values of Hockenbury et al. Inelastic scattering cross section is obtained by subtracting the cross sections of other processes from the total cross section. (informed by T. Murata, NAIG)

iii)   Evaluation of ν_p and σ_{tot} for ^{239}Pu has been performed on the basis of the experimental data compiled up to date. The energy dependence of ν_p is studied in the energy range below 15 MeV. The total cross section is obtained in the energy range 1 keV to 15 MeV. The evaluation of σ_f, σ_c, σ_{el}, σ_{in}, and $\sigma(n,2n)$ is in progress. (informed by M. Kawai, NAIG)

iv)   Evaluation of elastic and inelastic scattering cross sections, for ^{235}U in the energy range 1 keV to 15 MeV is in progress. The experimental data are very scanty and are only measured in the narrow energy ranges such as 300 keV to 5.5 MeV for σ_{el}, and 130 keV to 7.5 MeV for σ_{in}. In addition, there are some large discrepancies between the measured data. Accordingly, it is difficult to perform a consistent evaluation over the energy range 1 keV to 15 MeV on the basis of the compiled experimental data. Therefore, in the present evaluation, the optical model calculation is done using ELIESE-3 in order to check the energy dependences of both experimental data and obtain the cross sections in the energy range in which the experiments have not been done yet. At present, a comparison between the calculated values and experimental data of the angular differential cross sections for elastic scattering is in progress. (informed by H. Matsunobu, SAEI)

Work planned for the near future:

i)   Evaluation of the nuclear data for Am-241 will be started in the near future.

ii)   Evaluation of the nuclear data for about 50 fission product nuclides will be started within three months.

iii)   Application of Multi-level Breit-Wigner Formula for the levels
         whose spin-parities are not assigned.

         S. Igarasi

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