

Present Status of JENDL Project (April 2005)

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General

The purpose of the present JENDL project is to compile the JENDL-4 library. After the release of JENDL-3.3 in 2002, the main activities of Japanese nuclear data evaluation has been focused on the evaluation for JENDL-4. As one of the purposes of the JENDL-4 library is to contribute to the development of accelerator driven system (ADS), the evaluations of minor actinides and fission products are being done as a main activity.

The JENDL High Energy File is planned to be used in the J-PARC project of JAERI/KEK collaboration. In addition to the evaluated data of 66 nuclides released in 2004, the evaluation of other important nuclides is being performed.

Organization of Japanese Nuclear Data Committee

The activities of Japanese nuclear data evaluation are organized under Japanese Nuclear Data Committee. It is a joint committee of JAERI and AESJ (Atomic Energy Society of Japan).

- **Steering Committee (M. Igashira, M. Iwamura)**

- **Subcommittee on Nuclear Data (K. Shibata)**
High Energy Nuclear Data Evaluation WG (T. Fukahori),
Evaluation and Calculation System WG (T. Fukahori),
FP Nuclear Data Evaluation WG (K. Shibata),
Evaluation WG on Astrophysics (S. Chiba).

- **Subcommittee on Reactor Constants (N. Yamano)**
Reactor Integral Test WG (M. Ishikawa),
Shielding Integral Test WG (N. Yamano),
Standard Group Constants WG (A. Zukeran),
Medium and High Energy Nuclear Data Integral Test WG (T. Fukahori).

- **Subcommittee on Nuclear Fuel Cycle (J. Katakura)**
Decay Heat Evaluation WG (T. Yoshida),

WG on Nuclide Generation and Depletion (K. Okumura),
Fission Yield Evaluation WG (J. Katakura).

- **Standing Groups**

ENSDF Group (H. Iimura),
JENDL Compilation Group (K. Shibata),
CINDA Group (T. Nakagawa),
Group on Atomic, Molecular and Nuclear Data for Medical Use (T. Kobayashi),
Editorial Group of “Nuclear Data News” (T. Nakagawa),
High Priority Request List Group (T. Fukahori).

The nuclear data evaluation works are performed in the Subcommittee on Nuclear Data. The benchmark tests are carried out in the Subcommittee on Reactor Constants. The nuclear data on fuel cycle are discussed in the Subcommittee on Nuclear Fuel Cycle. Total 29 meetings were held in 2004 fiscal year (from April 2004 to March 2005).

Total number of the committee members is 103 in 2005. Nuclear Data Center, JAERI plays a role of the secretariat. In October, 2005, it is scheduled that JAERI and JNC (Japan Nuclear Cycle Development Institute) will be merged into a new institute. The above organization of Japanese Nuclear Data Committee would be affected by such integration.

Recent Development

Evaluation

Covariances of the following physical quantities contained in JENDL-3.3 were estimated for ADS development: total and elastic scattering cross sections of ^{15}N , inelastic scattering cross sections of $^{206,207,208}\text{Pb}$ and ^{209}Bi , ν -values of $^{237}\text{Np}(n,f)$ and $^{241,243}\text{Am}(n,f)$, and fission and capture cross sections of ^{238}Pu , ^{242m}Am and ^{244}Cm . These covariance data will be used for the sensitivity study of ADS system.

The priority list for the JENDL-4 evaluation of FP nuclides was determined. Of total 213 nuclides examined 91 nuclides were selected as priority A. The evaluation of FP nuclides will be performed consulting with the list. The resolved resonance parameters of FP nuclides (Ru, Y, Pd, Ag, Cd, In, Sn etc.) were updated for JENDL-4 by considering recent measurements.

Evaluations of neutron-induced reactions on Ge isotopes were performed in the JAERI/BNL collaboration. Naturally occurring Ge isotopes were evaluated with the photon production data.

Evaluations of the (α ,n) reaction data were done for the following nuclei: ^9Be , ^{27}Al , $^{28,29,30}\text{Si}$. The data for ^9Be nuclide were updated by user requests. These evaluated data will be included the present (α ,n) reaction data file 2003.

The first version of JENDL High Energy File containing the evaluated data for 66 nuclides was released in March 2004 as JENDL/HE-2004. The file contains the data up to 3 GeV incident energy. After the release of the file the data of the following 11 nuclides have been newly evaluated: $^{235,238}\text{U}$, ^{237}Np , $^{238-242}\text{Pu}$, $^{241,242,242m}\text{Am}$. The data of the following 14 nuclides contained in the first version have been revised: ^{12}C , ^{14}N , ^{16}O , $^{23-25}\text{Mg}$, ^{27}Al , $^{28-30}\text{Si}$, $^{54,56-58}\text{Fe}$.

Code Development

Nuclear model codes play a significant role in nuclear data evaluation. Unfortunately, we have mainly used model codes developed in foreign countries, although optical and statistical model codes had been developed in the early stage of the JENDL evaluations. We have resumed making nuclear model codes in order to reflect recent advances in nuclear theories on evaluations. This would make future extensions of code easier. At present, we have new spherical optical model, DWBA and coupled-channel optical model codes (CCOM, CCDM, CCPM, CCSM and POD).

Other Activities

Development of Data Utilization System

We are developing the Combined System for Nuclear Data Utilization, Circulation and Transfer (CONDUCT). This is conducted by the research contract with the Ministry of Education, Culture, Sports, Science and Technology (MEXT) as one of Innovative Nuclear Energy System Development Projects. The system provides two functions: 1) retrieval of original data, 2) processing of data for applications. It is planned to carry out simple benchmark calculations for feedback to evaluations. The system will be completed in FY2006 and accessed by registered users via internet.

The main work of the MEXT project is the development of the detector system to measure the nuclear data of minor actinides. The measurements of fission and capture cross sections of ^{237}Np , $^{241,243}\text{Am}$ are planned. The measured data are scheduled to be obtained from late 2005. After the measurement the evaluation will be performed based on the newly measured data.

Chart of the Nuclides 2004

The chart of the nuclide has been published in every 4 years from 1976. The 2004 version of the chart, Chart of the Nuclide 2004, was published. It includes 2913 identified isotopes. Of those 2752 isotopes have measured half-

lives. IUPAC recommendation for the symbols of the elements with atomic number 110 and 111 was adopted in the chart.

2004 Symposium on Nuclear Data

The 2004 Symposium on Nuclear Data was held on 11th and 12th November 2004 at Tokai Research Establishment, JAERI. The number of attendees is 125. Topics of the symposium are 1) Nuclear Data for LWR and Fuel Cycle, 2) Experiences from Use of JENDL-3.3 and Requests to JENDL-4, 3) Nuclear Data for ADS Development, 4) Recent Cross Section Measurements and 5) Nuclear Data for Life and Material Sciences. In the symposium 19 papers were presented in the oral session and 21 papers in the poster session. The proceedings will be published shortly.