

# Present Status of CENDL Project

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There are three national nuclear data projects in CNDC: general purpose file; nuclear physics basic database; nuclear data for ADS.

## 1. General purpose file

From 1996 to 2001, we have completed the evaluation of CENDL-3.0, total 209 nuclides are include CENDL-3.0, among them, the data of 169 nuclides were newly evaluated. The data are contained in the energy range from  $10^{-5}$  eV to 20 MeV. The ENDF-6 format is adopted, the files 1,2,3,4,6,12-15 are included for major fissile nuclide, structure material and light nuclide, files 1,2,3,4,5 are given for minor fissile and fission production nuclides. The data of CENDL-3.0 are being tested and improved for the problems found in the test.

Benchmark analysis for some nuclides of CENDL-3.0 has been done at CNDC, and the comparisons of calculated results based on CENDL-3.0 with different evaluated nuclear data libraries were also made.

Validation of CENDL-3.0 for fissile nuclei and light nuclei, such as Uranium isotope, Plutonium isotope and beryllium etc was also done

according to the benchmarks testing results.

Some conclusions were gotten from the results of benchmark testing. It can be seen that different evaluated nuclear data library is the cause of the difference of the calculated results for the benchmarks.

For most uranium critical benchmarks, the calculated results with CENDL-3.0 are in good agreements with experimental results.

For some plutonium fast cores, CENDL-3.0 also gives better calculated results compared with those of other evaluated nuclear data libraries.

The benchmark testing of the  $^{232}\text{Th}$  of CENDL-3.0 for limited integral experiments was also done, and further benchmark testing will be done with this material.

Further benchmark testing for beryllium has been done. The results were improved considerably compared with CENDL-2.1. It can be seen that the  $^9\text{Be}$  of CENDL-3.0 shows good agreements with experiment for most assemblies

Benchmark testing for some structure materials has been done at CNDC, and further benchmarks testing will be done with these material.

From 2001, we began a new five years plan of CENDL. The data of total 281 nuclides will be evaluated, covariance data will be included for ten important nuclides. The data of total 61 nuclides have been evaluated by now.

## The new five years plan

Nuclides	Fissile Nuclides	Structure Material	Fission products	Light Nuclides	Total
Planned	44	58	166	13	281
Evaluated	2	16	41	2	61

The number of prompt ( $\nu_p$ ) and delayed ( $\nu_d$ ) neutrons emitted per fission event was evaluated for  $^{239}\text{Pu}$  based on absolute measurements and relative to the spontaneous fission of  $^{252}\text{Cf}$ . The dependence of prompt neutron number on incident neutron energy for  $^{239}\text{Pu}$  was given from  $10^{-5}$  eV to 20 MeV.

The mass distribution data for  $^{238}\text{U}$  at  $E_n=1.5, 5.5, 8.3, 11.3, 14.9, 22.0, 27.5, 50.0, 99.5, 160.0$  MeV,  $E_p=20.0, 60.0$  MeV,  $^{239}\text{Pu}$  at  $E_n=0.17, 7.9, 14.5$  MeV and  $^{242}\text{Pu}$  at  $E_n=15.1$  MeV were evaluated and recommended on the basis of the main available experimental data up to now.

We have set up nuclear data online service system in china, the Chinese version is provided at <http://159.226.2.40/>, the English version will be provided soon. A program for plotting experimental and evaluated cross section data at the same time online is developed.

### (2) Nuclear physics basic database:

The project is supported by China Ministry of science and technology,

and it contain the following data base:

1. Nuclear structure and Nuclear Decay database
2. Nuclear Model Parameters and computing programs library
3. Special Purpose database
4. Exfor Database
5. Evaluation Nuclear data library

(3) Nuclear data for ADS

This work is a part of the project of ADS system of China, and is supported by China Ministry of science and technology. The project include the following parts:

1. Intermediate energy files
2. Study of Spallation target
3. Multi-group cross section generated

Joint the need of intermediate energy files, a new program MEND for calculating the nuclear data in medium energy region has been developed. The calculations for  $p+^{208}\text{Pb}$  and  $p+^{209}\text{Bi}$  with MEND are performed, and the calculated results are rather good in accordance with experimental data and reasonable in physics.