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Present Status of JENDL Project

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1. JENDL-3 revision 2 (JENDL-3.2)

The second revised version of JENDL-3 (JENDL-3.2) was released in June 1994. It contains the data for 340 nuclides in the energy range from 10^{-5} eV to 20 MeV. The ENDF-6 format was adopted for JENDL-3.2. The pointwise files were constructed at 0 K and 300 K by using RESENDD, RECENT, LINEAR and SIGMA1.

Though JENDL-3.2 gives much better evaluated data than JENDL-3.1, JENDL-3.2 has no covariance matrices. We recognize importance of the covariance matrices. A new working group has been organized in Japanese Nuclear Data Committee (JNDC) for the study of evaluation method of the covariance matrices.

The benchmark tests have shown that JENDL-3.2 gave much better prediction of various reactor characteristics than JENDL-3.1, though some problems have been pointed out. From some other check and review, several points were found out to improve JENDL-3.2. A new task force in Japanese Nuclear Data Committee (JNDC) has been organized to summarize the problems of JENDL-3.2.

The data improvement of JENDL-3.2 will start from next year by using the information including results from above 2 groups.

2. JENDL Special Purpose Files

The following special purpose files other than JENDL-3.2 general purpose file are being developed in Japan. Their status is given below.

JENDL Fusion File

JENDL Fusion File is made to provide precise double-differential neutron and charged particle emission data by using MF6 representation of the ENDF-6 format. The evaluation has been almost finished for the data of H, D, Li, Be, C, N, O, ^{19}F, ^{27}Al, Si, Ca, Ti, Cr, ^{55}Mn, Fe, ^{59}Co, Ni, Cu, ^{75}As, Zr, ^{93}Nb, Mo, Sn, Sb, W, Pb and ^{209}Bi. For H, D, Li, N and O, the data of JENDL-3.2 are directly adopted. The revision works for some nuclides except light mass nuclei have been performed by the SINCROS-II code system which consists of GNASH, DWUCK, CASTHY and several auxiliary programs. Those results are examined by comparing with DDX measured at Tohoku and Osaka Universities. For the data of light mass nuclei, individual evaluation has been done.

JENDL Actinide File

This file will provide the data of about 90 nuclei in the actinide region from 10^{5} eV to 20 MeV. Data for about 60 nuclei will be taken from JENDL-3.2 with some modification. We need

new evaluation work for about 30 nuclei, among which the evaluation have been completed for ^{235}Np, ^{237}Pu, ^{241}Pu and ^{246}Pu. From the last year, International Science and Technology Center (ISTC) project for Evaluation of miner actinide nuclei has been started at Institute of Physics and Power Engineering (IPPE, Obninsk) and Radiation Physics and Chemistry Problem Institute (RPCPI, Minsk). The results will be considered in JENDL Actinide File.

JENDL Dosimetry File

The working group on dosimetry in JNDC which is working for JENDL Dosimetry File is now considering update of the file. The cross section data for more than 20 reactions will be revised and their covariance matrices will be replaced with new ones. Integral tests will be carried out after the data reviewed.

JENDL Activation Cross Section File

Evaluation and compilation work for JENDL Activation Cross Section File has been completed. Its first version stores the data for 233 nuclei and 1246 reactions. The working group for the file has reviewed the data in the file. The first version of the file was released in March 1996 as the JENDL Activation Cross Section File 96.

JENDL High Energy Files

The evaluation of data for high energy neutrons and protons has been initiated in JNDC. They will make data files for neutrons and protons up to 50 MeV and about 1.5 GeV.

The former files will be used for the IFMIF project which JAERI participates. The evaluation of neutron data up to 50 MeV has been made for almost all necessary nuclides. The evaluations results for neutron are being reviewed. After review, the data will be convinced with JENDL Fusion File or JENDL-3.2 below 20 MeV.

The latter files will be used for design of accelerators, transmutation systems of high-level waste and so on. The evaluations of Al, Si, Cr, Ni, Cu, Pb and Bi isotopes were made for neutron and proton induced reactions up to 1 GeV. The neutron nuclear data for hydrogen are also finished. These data will be reviewed.

JENDL PKA/KERMA File

This file stores the spectra of primary knock-on atoms (PKA) and KERMA factors. The data to be stored are created from the data files up to 50 MeV made for the IFMIF project. A couple of processing codes to create the file from evaluated nuclear data file, by using the effective single particle emission approximation, have been developed and tested.

The test compilation has been performed from JENDL Fusion File for the 69 isotope data except light mass nuclei below 20 MeV.

JENDL Photonuclear Data File

The evaluation has been almost finished for 46 isotopes; ^{2}D, ^{12}C, ^{14}N, ^{16}O, ^{23}Na, ^{24,25,26}Mg, ^{27}Al, ^{28,29,30}Si, ^{40,48}Ca, ^{46}Ti, ^{51}V, ^{52}Cr, ^{55}Mn, ^{54,56}Fe, ^{59}Co, ^{58,60}Ni, ^{63,65}Cu, ^{90}Zr, ^{93}Nb, ^{92,94,96,98,100}Mo, ^{133}Cs, ^{160}Gd, ^{182,183,184,186}W, ^{197}Au, ^{206,207,208}Pb, ^{209}Bi and ^{235,238}U in the γ-ray energy range up to 140 MeV. Their compilation in the ENDF-6 format and review are in progress.