

Development of BROND

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1. New files of evaluated cross sections for Cr-52, Fe-56, and Be-9 were prepared during the last year on the basis of collaboration with IRK(Vienna). The improved evaluations of double differential cross sections, uncertainties of cross sections and corresponding covariance matrices were included into new files.
2. New evaluations for Pa-231 were finished and the full file is compiled.
3. New files of Minsk group evaluations for Cm-243, -245, and -246 and Am-241 are under consideration now to include it to BROND.
4. New evaluations for most important cross sections of Np-237 are prepared on the basis of ISTC project. The corresponding files are under preparation and testing now. The final version of evaluations will be prepared taking into account new experimental data that will be obtained at IPPE during the next year.
5. Revised versions of files for D, N-14, -15, Nb-93, Zr-isotopes, Si-nat, and Sn-nat were prepared as a contribution to FENDL-2 (See appendix 1).
6. The new version of the neutron resonance parameter library (Lipar-5) was received from Kurchatov Institute. The library contains data for 94 isotopes that are important for thermal reactor calculations.
7. Great efforts were spent during the last two years to analyze experimental data and evaluated cross sections for the most important neutron induced threshold reactions. A main attention was paid to search of criteria for selection of most reliable data from numerous evaluations or calculations. As a result some new systematics of threshold reaction cross sections were developed and improved evaluations for many isotopes were prepared. On the basis of this analysis and recommendations of the St. Petersburg and San Diego meetings the new revised version of Russian Activation Data Library (ADL-4) should be prepared.
8. IPPE activity on intermediate energy data ^{is} reflected in appendix 2.

THE MODIFICATIONS OF BROND-FILES FOR FENDL-2 (Intercomparison plots and review kit)

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According to the recommendations of the previous FENDL-1 (Del Mar 1995) meetings the following materials from the Brond-2 were included as the candidates to the FENDL-2 library: H-2, Nb-93, Sn-nat. In during Jan.96-Mar.96 some revisions of these data files were performed. Below we will give a short description our activity in this field.

1. Deuterium.

Data modified: MF/MT=6/16

New data: MF/MT= 8/102; 9/102; 12/102; 14/102;

Data deleted: MF/MT=6/102;

2. Niobium.

Data for gamma-production was slightly revised (MF=15).

New data: MF/MT=8/4; 8/16; 10/4; 10/16;

33/1; 33/2; 33/4; 33/16; 33/17; 33/22; 33/28; 33/32; 33/33;

33/34; 33/102; 33/103; 33/104; 33/105; 33/106; 33/107;

40/4; 40/16;

3. Tin.

New data: MF/MT=33/1; 33/2; 33/4; 33/16; 33/17; 33/102; 33/103; 33/107;

Data deleted: MF/MT=12/51 - 90; 14/51 - 90;

4. Nitrogen-14.

Data for MF=3,5 MT=22, 28, 32, MF=12 MT=51-70 were revised. Main problem: data file for N-14 includes 348 data sections. Now we can not process this file by NJOY-system, but we may process by GRUCON-package.

5. Nitrogen-15.

For completeness we included data for nonelastic, emission neutron spectrum for inelastic, data for gamma-production (MF=13/15, MT=3).

6. Silicon. Small corrections of cross-section data (MF=3) for data presentation, additional data for gamma production (MF=15 MT=16).

7. Zirconium isotopes.

New data for all charge-particle emission data are included.

New data for isomer-production (MF=10) are added. Gamma-ray production for inelastic, capture and nonelastic processes are included.

STATUS REPORT
On Intermediate Energy Nuclear Data Activity
IPPE, Obninsk, May 1996

1. The calculations according to Specifications for an International Codes and Model Intercomparison for Intermediate Energy Activation Data were performed. Three codes were used for different energy regions: ALICE/IPPE, DISCA, CASCADE.
2. Data library MENDL-2 was completed for proton induced reactions up to 200 MeV. At the moment some testing and analysis is carrying out. After final choice of FORMAT representation the library will be delivered to NDS IAEA and NEA Data Bank ~1 October 1996.
3. The calculations and analysis of isotope concentrations and accumulation of long-lived activity in heavy liquid metal targets (Pb, Pb-Bi, Hg) have been performed for various energies (400, 800, 1000 and 1600 MeV). The dominating components to the total radioactivity resulting from spallation reactions, fission and radiative capture for various irradiation and cooling times were determined. The estimations of spectral component contributions of neutron and proton fluxes to the accumulated activity were carried out. Most important energy regions for the problem were determined. The contributions of fission products to the target activity and partial activities of main long-lived fission products were estimated. The production of tritium in the targets was estimated and energy dependence of tritium production cross sections was analyzed.
4. Calculations and analysis of the excitation functions for the more than 50 reactions, induced by protons deuterons and alpha-particles, that are important for medical radioisotope production in the mass region $Z=51-55$ and $Z=80-83$ have been performed in a wide energy region up to 100 MeV.
5. The sensitivity to optical potential parameters and nuclear structure in reaction cross section calculations is investigated. The effect of imaginary part of optical potential on the intranuclear transition rates in hybrid model, on the calculated nonequilibrium emission spectra was considered. The comparison of calculated and experimental spectra indicate the anomalous energy dependence of imaginary part of optical potential. The probable reasons for such dependence are analyzed.
The effect of nuclear structure on the level density and on calculated reaction cross sections at intermediate energies was considered. The geometry dependent hybrid model has been used to obtain preequilibrium particle spectra. The calculated cross sections were compared with experimental data in the energy region up to 200 MeV. It is shown that generalized superfluid model is preferable for the better description of experimental data.
6. The description of the ALICE/IPPE and DISCA codes used for calculations are in preparation and can be presented ~1 October 1996.

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