

NEANSC Working Party on International Evaluation Cooperation
Brookhaven National Laboratory, 19-21 April 1999

STATUS OF BROND PROJECT

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1. Start of BROND-3 formation

New evaluations of the complete neutron data files for the most important minor actinides ^{237}Np , ^{241}Am and ^{243}Am are prepared and tested against the benchmarks available. These evaluations differ essentially for the fission and capture cross sections at some energy regions from the recent evaluations of the Minsk group. We consider new evaluations as a beginning of BROND-3 library formation. In collaboration with ENEA (Bologna) we study now possibilities to improve the evaluated data for ^{240}Pu and ^{242}Pu .

We continue the analysis of data for the thorium fuel cycle. The benchmarks performed with the COBRA assemblies confirmed the BROND-2 evaluations of the fission, capture and (n,2n) cross sections for ^{232}Th and ^{233}U within an accuracy about 5%. On the other hand the analysis of the thorium samples irradiated in BN-350 reactor demonstrated that the capture cross section for ^{231}Pa is overestimated on 50 %. Completely new evaluations of the neutron cross sections for ^{231}Pa are performed and the corresponding file is under formation now.

It should be noted that practical calculations of reactors and critical assemblies are performed now on the basis of the ABBN-93 group constants that are adjusted to many available benchmarks. Originally the group constants were obtained from the BROND-2 evaluations, but as a result of adjustments the essential differences have arisen for many nuclei. So we want to remove the main contradictions in the process of the BROND-3 formation.

At the present time the RNDP specialists in co-operation with the experimental group from the VNIIRF (Sarov) are engaged in the ISTC-project 731, the objective of which is the measurement, analysis, and evaluation of the gamma-ray production cross section and spectra for main structural materials. New experimental data on the gamma-ray spectra for 14.5 MeV neutrons are obtained for ^{11}B , C, Mg, Al, Ti, V, Cr, Fe, Ni, Cu, Zr, Mo, W, Pb, Bi. New evaluations of the gamma-ray production cross sections for the whole energy range up to 20 MeV are finished for ^{27}Al , ^{93}Nb , ^{209}Bi and natural Pb. Similar evaluations for separated Fe and Zr isotopes should be finished during this year. The neutron inelastic scattering, (n,2n) and capture cross sections are re-evaluated for all considered nuclei on the basis of the consistent statistical description of available experimental data. The new complete data files for ^{209}Bi and lead isotopes should be prepared to the end of the year.

2. Evaluations for intermediate energies

Evaluations of the neutron and proton induced reaction cross sections for ^{232}Th at the energy region up to 150 were performed. The coupled channel optical model was used to calculate the neutron total, elastic and integral reaction cross sections and the elastic scattering

angular distributions. Evaluations of the neutron and charge particle emission cross sections and also the fission cross sections are obtained on the basis of the statistical description that includes direct, preequilibrium and equilibrium mechanisms of nuclear reactions. The Kalbach-Mann presentation of angular distributions is used to describe the double-differential spectra of emitted neutron and charged particles in the ENDF-6 format.

3. Russian Reactor Dosimetry File

New version of the Russian Reactor Dosimetry File (RRDF-98) is prepared and presented for distribution to the IAEA. RRDF-98 is further development of the previous version of RRDF-94 and it includes 34 neutron reaction cross sections widely used in the fission reactor dosimetry. Most reactions were essentially revised, corrected or re-evaluated in the new version. All evaluations are made using the generalised least squares method. The covariance matrices are prepared and the data are presented in ENDF-6 format (files 3, 30, 33). The test of evaluations against the cross sections measured in the ^{252}Cf and ^{235}U fission spectra was done. Improvements relative to the International Reactor Dosimetry File (IRDF-90) are briefly discussed in the corresponding publications.