 Contribution to FPND progress report (1979)

Laboratory and address: Japanese Nuclear Data Committee/FPND W.G.,
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T. Aoki (Fuji Electric Co.)
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T. Watanabe (Kawasaki Heavy Industries)
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R. Nakasima (Hosei Univ.)

Evaluation: Neutron cross sections of Nd isotopes.

Method: Calculation with spherical optical model and statistical
theory. Single and multi-level DW formula in thermal and
resonance regions. Optical model parameters are determined
by SPRT method. Level density parameters are re-evaluated.

Source: NEUDADA, CINDA, and the recent capture data for Nd isotopes
at JAERI and Lebedev institute. Integral data from STEK
and CFRMF.

Deadline of literature coverage: Spring, 1979

Status: Progress is very slow. Difficulties are encountered in the
consistent determination of level density parameters a, T, etc.

Other relevant details:
The evaluation of 68 nuclides was completed in Aug., 1977,
and the file is available from NEA Data Bank. Integral
test calculation using STEK reactivity data and CFRMF activa-
tion data was completed recently. Results are being
examined.

Computer file of evaluated data: JENDL (ENDF/B-4 format)
cont'd

Expected completion data: The work is largely behind schedule.

Discrepancies encountered:

Summarized in No. 4 of publication list.

Recent publications:

5. H. Nishimura et al., Integral test of JENDL-FP data file, JAERI-M report (to be published shortly)
Laboratory and address: Research Laboratory for Nuclear Reactors, Tokyo Institute of Technology 2-12-1, O-okayama, Meguro-ku, Tokyo

Names: N. Yamamuro, K. Saito, T. Wada (TIT) Y. Fujita, K. Kobayashi (Research Reactor Institute, Kyoto University)

Facilities: 46-MeV Electron Linear Accelerator (Research Reactor Institute, Kyoto University)

Experiment: Capture Cross Section Measurements of \(^{93}\text{Nb},^{127}\text{I}, \text{and}^{133}\text{Cs}\) from 3 to 80-KeV using time-of-flight method

Method: Gamma-rays from the neutron capture processes were detected by a \(\text{C}_6\text{F}_6\) or a \(\text{C}_6\text{D}_6\) liquid scintillation detector. Neutron flux impinging on the sample was measured by \(^{10}\text{B}\) (93%) disk placed at the sample position. The absolute values of cross section were determined by normalizing to the 24-KeV cross sections measured with Fe-filtered method. Corrections for self-shielding and multiple scattering were performed using average cross sections. These data are currently examined for the correction for resonance self-shielding.

Accuracy: Error of absolute cross section at 24-KeV is about 5% Statistical error of measured cross sections is 2 to 4%

( Expected ) Completion Date: June, 1979 for \(^{93}\text{Nb}\) and \(^{127}\text{I}\) Sept., 1979 for \(^{133}\text{Cs}\)

JAPAN

Laboratory and address: Nuclear Physics II Laboratory,
Tokai-Mura, Naka-Gun, Ibaraki-Ken, Japan.

Names: A. Asami, Y. Nakajima, M. Mizumoto, M. Ohkubo,
Y. Kawarasaki, Y. Furuta (JAERI)
T. Yamamoto, M. Sugimoto (Tohoku Univ.)
Y. Kanda, T. Kawano (Kyushu Univ.)

Facilities: 120 MeV linac neutron TOF spectrometer.

1. Experiment: Neutron capture cross section measurements in the
keV region.

Method: 3500 l liquid scintillator tank at 52 m flight path with
a resolution of 1.9 to 0.5 nsec/m.

Analysis: Multiple scattering correction and self shielding (Schmitt,
Monte Carlo) in the sample and neutron detector.
Self shielding correction (Dresner, Macklin).

(1) Samples: $^{151}$Eu, $^{153}$Eu, Eu. Chemical form Eu$_2$O$_3$, Separated isotope
samples are enriched to over 96 % for each isotope, loaned
from ORNL.

Accuracy: 6 to 10 %.
Energy region: 3 to 100 keV.
Expected completion date: $^{151,153}$Eu May 1979.

Publication:
A. Asami et al., Neutron capture cross section measure-
ments of $^{151,153}$Eu and Eu, Topical Conf. of Technique on

M. Mizumoto et al., Average neutron capture cross sections
of $^{151}$Eu and $^{153}$Eu from 3 to 100 keV, to be published.

(2) Samples: $^{143,145,146,148}$Nd, enriched to over 91 % for each isotope,
Nd$_2$O$_3$ in chemical form, loaned from ORNL.

Energy region: 5 to 300 keV.
Accuracy: 8 to 30 %.
Expected completion date: Dec. 1979.

Publication:
Y. Nakajima et al., Neutron capture cross section
measurements of Nd-143, Nd-145, Nd-146 and Nd-148, Int.
Conf. on Neutron Physicl and Nuclear Data,Harwell., 1978.
(3) Samples: $^{147,149}$Sm, enriched to over 97% for each isotope, $\text{Sm}_2\text{O}_3$ in chemical form, loaned from ORNL.

   Energy region: 1 eV to 300 keV.
   Status: Measurements in progress.

2. Experiment: Neutron resonance parameters.
   Method: A $^6$Li-glass neutron detector and a Moxon-Rae detector at 47 m flight path.
   Analysis: Atta-Harvey code and Monte Carlo code MCRTOF.

(1) Sample: Tb.
   Results: Resonance parameters for 209 levels including 50 newly discovered ones in the region 3 to 1190 eV.
   Completion date: Feb. 1978.

Publications:


(2) Samples: $^{79,81}$Br, enriched to over 97% for each sample, NaBr in chemical form, loaned from ORNL.

   Status: Measurements in progress.