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ENDF/B-6 charged-particle sublibraries

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1999 version

Additions by G.M. Hale and M. Drosg
M.B. Chadwick and P.G. Young, LANL

Summary by

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Abstract: This document summarizes the ENDF/B-6 sublibraries for nuclear reaction data of protons, deuterons and tritons. Presently included are complete (double differential) evaluations for the interaction of protons with H-1 and He-3, and evaluated cross-sections for five fusion reactions between d, t, and He-3 particles. The 1998, 1999 and 2000 updates includes complete presentation of the nuclear data for H-1,H-2,He-3,C-12,N-14,O-16,Al-27,,P-31,Ca40,Nb-93,Bi-209 and Isotopes of Si, Cr, Fe, Ni, Cu, W, Pb, needed for transport, damage, heating, radioactivity and shielding applications over the incident proton energy range from 1 to 150 MeV.

The data library, which has a size of 40.0 Megabytes, is available upon request from the IAEA Nuclear Data Section, costfree, on floppy diskette, or CD-ROM. The library is available online within NDIS, the Nuclear Data Information System and also from the WWW pages of the Nuclear Data Section.

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username: IAEANDS for interactive Nuclear Data Information System
usernames: ANONYMOUS for FTP file transfer;
FENDL2 for FTP file transfer of FENDL-2.0;
RIPL for FTP file transfer of RIPL;
NDSONL for FTP access to files sent to NDIS "open" area.
Web: http://www-nds.iaea.or.at

Note:

The IAEA-NDS-reports should not be considered as formal publications. When a nuclear data library is sent out by the IAEA Nuclear Data Section, it will be accompanied by an IAEA-NDS-report which should give the data user all necessary documentation on contents, format and origin of the data library.

IAEA-NDS-reports are updated whenever there is additional information of relevance to the users of the data library.

For citations care should be taken that credit is given to the author of the data library and/or to the data center which issued the data library. The editor of the IAEA-NDS-report is usually not the author of the data library.

Neither the originator of the data libraries nor the IAEA assume any liability for their correctness or for any damages resulting from their use.

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Citation guidelines:

a) *citing the evaluation of one material*

Author(s), "Proton reaction data evaluation of …", report ... (place, year) [or, if no report is available: Undocumented]. Data file ENDF/B-VI MAT 1234 Rev. 2 (date) by the U.S. National Nuclear Data Center on behalf of the Cross-Section Evaluation Working Group. Data received on diskette or CD-ROM (or retrieved online) from the IAEA Nuclear Data Section.

b) *citing the entire library*

H.D. Lemmel, et al. (ed.), "ENDF/B-6 charged-particle sublibraries", informal report IAEA-NDS-105, Rev. 98/11.

c) *citing the format*

V. McLane, P.F. Rose, C.L. Dunford (ed.), "Data formats and procedures for the Evaluated Nuclear Data File ENDF-6", report BNL-NCS-44945 (ENDF-102) Rev 2/97 (Brookhaven National Laboratory 1997).

ENDF/B-6 charged-particle sublibraries

This data library of evaluated charged-particle nuclear reaction data was presented at the 1991 Nuclear Data Conference in Jülich.

It contains the following sublibraries and reactions:

The following data were distributed by the US National Nuclear Data Center on 6 Sept. 1991 on

tape 300: proton sublibrary,
tape 320: deuteron sublibrary,
tape 340: triton sublibrary.

The following data were distributed by the US National Nuclear Data Center in September 1998 on

tape 301: proton sublibrary,
tape 321: deuteron sublibrary.

The following data were distributed by the US National Nuclear Data Center in August 1999 on

tape 302: proton sublibrary,
tape 303: proton sublibrary,
tape 304: proton sublibrary,
tape 305: proton sublibrary,
tape 306: proton sublibrary,
tape 307: proton sublibrary,
tape 308: proton sublibrary,

The following data were distributed by the US National Nuclear Data Center in April 2000 on

tape 309: proton sublibrary,

The library is in ENDF-6 format, which is documented in IAEA-NDS-76 Rev. 4.

Note: For high-energy proton cross-section data see the ENDF/B-6 High-Energy Data File, IAEA-NDS-113.

Proton sublibrary

MAT	Nucl.	Data	Tape Rlsd.	Status
125	1-H-1	(MT=2, MF=3 and 6) 1999 New Evaluation:	Mod.1: 300 Mod.2: 302	new
128	1-H-2	(MT=2,28,102, MF=3 and 6) 1999 New evaluation	Mod.1: 300 Mod.1: 302	new
225	2-He-3	(MT=2,111, MF=3 and 6)	Mod.1: 300	new
625	6-C-12	(MT=2,5, MF=3 and 6) 1999 Minor Revisions	Mod.1: 301 Mod.2: 302	new
725	7-N-14	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 302	new
825	8-O-16	(MT=2,5, MF=3 and 6) 1999 Minor revisions	Mod.1: 300 Mod.2: 302	new
1325	13-Al-27	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 302	new
1425	14-Si-28	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 302	new
1428	14-Si-29	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 302	new
1431	14-Si-30	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 302	new
1525	15-P-31	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 303	new
2025	20-Ca-40	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 303	new
2425	24-Cr-50	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 303	new
2431	24-Cr-52	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 303	new
2434	24-Cr-53	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 303	new
2437	24-Cr-54	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 303	new
2625	26-Fe-54	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 304	new

MAT	Nucl.	Data	Tape Rlsd.	Status
2631	26-Fe-56	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 304	new
2634	26-Fe-57	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 304	new
2825	28-Ni-58	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 305	new
2831	28-Ni-60	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 305	new
2834	28-Ni-61	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 305	new
2837	28-Ni-62	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 305	new
2843	28-Ni-64	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 305	new
2925	29-Cu-63	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 306	new
2931	29-Cu-65	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 306	new
4125	41-Nb-93	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 306	new
7431	74-W-182	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 307	new
7434	74-W-183	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 307	new
7437	74-W-184	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 307	new
7443	74-W-186	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 307	new
8231	82-Pb-206	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 308	new
8234	82-Pb-207	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 308	new
8237	82-Pb-208	(MT=2,5, MF=3 and 6) 1999 New evaluation	Mod.1: 308	new
8325	**83-Bi-209**	**(MT=2,5, MF=3 and 6)** **2000 New evaluation**	**Mod.1: 309**	**new**

Data for 1-H-1 and 2-He-3 were obtained from an R-Matrix calculation by D. Dodder and G. Hale at the Los Alamos National Laboratory, USA.

All other data were produced with FKK/GNASH/GSCAN code by M.B. Chadwick and P.G. Young at the Los Alamos National Laboratory, USA, in cooperation with ECN Petten. Complete presentation of the nuclear data needed for transport, damage, heating, radioactivity and shielding applications over the incident proton energy range from 1 to 150 MeV.

Deuteron sublibrary, 2893 records

1-H-2(d,n)2-He-3	Tape 320
1-H-2(d,p)1-H-3	Tape 320
2-He-3(d,p)2-He-4	Tape 320

Above data containing only integral cross section for incident energy up to 30 MeV were evaluated and compiled by R.M. White and D.A. Resler at the Lawrence Livermore National Laboratory, USA. Included in the free text section are compilations of experimental data by various authors.

1-H-3(d,d)elastic	(MT=2, MF=3 and 6)	Tape 321
1-H-3(d,n0)2-He-4	(MT=50, MF=3 and 6)	- " -
1-H-3(d,n1)2-He-4	(MT=51, MF=3 and 6)	- " -

Above evaluation is based on ^{5}He system R-matrix analysis by G. Hale (1994) and T(d,n) Legendre coefficients evaluated by M. Drosg (1994).

Triton sublibrary, 458 records

1-H-3(t,2n)2-He-4	Tape 340

Above data containing only integral cross section for incident energy up to 30 MeV were evaluated and compiled by R.M. White and D.A. Resler at the Lawrence Livermore National Laboratory, USA. Included in the free text section are compilations of experimental data by various authors.