



**HOKKAIDO**  
UNIVERSITY

# JCPRG Progress Report

June 17, 2025

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JAPAN

# Nuclear Reaction Data Centre (JCPRG), Hokkaido University

Member	
<b>Centre head</b>	K. Nomura (Prof.)
<b>Compiler</b>	S. Watanabe (PD) Y. Obata (M2) K. Suzuki (M2) (M. Aikawa (Prof., supporting member))



## Entries transmitted since the previous NRDC meeting

- We transmitted 38 new and 95 revised entries as 13 trans and prelim files (E142-E153 and R031).

TRANS	TRANS Status	ENTRY Tot.	ENTRY New	ENTRY Rev.
E142	Final (2024/5/3)	9	9	0
E143	Final (2024/5/5)	19	0	19
E144	Final (2024/5/5)	17	0	17
E145	Final (2024/6/25)	10	1	9
E146	Final (2024/6/25)	10	3	7
E147	Final (2024/6/25)	7	0	7
E148	Final (2024/8/9)	10	2	8
E149	Final (2024/8/12)	6	0	6
E150	Final (2024/8/15)	5	3	2
E151	Final (2024/12/30)	11	11	0
E152	Prelim (2025/5/27)	6	6	0
E153	Prelim (2025/6/2)	13	3	10
R031	Final (2024/12/30)	10	0	10



# Software for compilation and data retrieval system

- Software for coding
  - Editor “HENDEL”, <https://www.jcprg.org/manuals/hendel/>
  - Digitizer “GSYS”, <https://www.jcprg.org/gsys/2.4/>
- Data retrieval system
  - NRDF: <http://www.jcprg.org/nrdf/>
  - EXFOR/ENDF: <http://www.jcprg.org/exfor/>



# Web-based Editor for Nuclear Data (HENDEL)

- HENDEL:
  - is available on many browsers.
  - does not require compilers' knowledge of EXFOR format.
  - Provides selective items to reduce illegal codes.
  - Creates the two formats, EXFOR and NRDF, simultaneously.

The image displays three screenshots of the HENDEL web-based editor interface, illustrating its functionality for nuclear data entry and visualization.

**Left Screenshot: Main Editor**

The main editor window shows the title "E2338" and the article title "Measurement of proton-production double differential cross sections from 290 MeV/u 12 incidence on carbon at forward angles". The authors listed are Y. Fukuda<sup>1</sup>, G. Wakabayashi<sup>2</sup>, K. Takara<sup>1</sup>, H. Ban<sup>1</sup>, Y. Morimoto<sup>1</sup>, K. Kiyohara<sup>1</sup>, Y. Fukui<sup>1</sup>, Y. Koba<sup>1</sup>, H. M. Imamura<sup>1</sup>, Y. Uemura<sup>1</sup>, N. Matsufuji<sup>2</sup>, and Kyushu Univ., Fukuoka. The journal is "Journal of Nuclear Science and Technology", Volume 1, 102. The interface includes a sidebar with navigation links (NRDF, EXFOR, Bib, Data, etc.) and a "Convert" button.

**Middle Screenshot: Target and Accelerator Input**

This screenshot shows the "Target" and "Accelerator" input fields. The "Target" section includes fields for Target Enrichment, Chemical Form, Physical Form, Target Thickness, Backing, Backing Thickness, Target Polarization, and Target Alignment. The "Accelerator" section includes fields for Accelerator Type and Institute, Inc. Energy Value, Inc. Energy Uncert., Inc. Energy Resol., and Beam Intensity.

**Right Screenshot: Graph List**

This screenshot shows the "Graph List" section, displaying a plot of the differential cross section (d $\sigma$ /d $\Omega$  d $E$  d $\theta$ ) versus energy (E [MeV]). The plot shows data points with error bars. The error type is specified as "AB, x-linear y-linear". The graph is titled "Data.1: Fig.7 of NST.vol.1,p.102(2011)". Below the plot, there is a table with data details:

Data.1	X	Y	Y-Err
Quantity	ENGY-EMT-1-LAB	DSIGMA/DOMEGA/DE	DELTA DSIGMA/DOMEGA/DE
Unit	MEV	MB/SR/MEV	MB/SR/MEV

Below the table, it states "Data.2: Fig.7 of NST.vol.1,p.102(2011)".



# Web-based Editor for Nuclear Data (HENDEL)

## E2798 - Bibliographic Information

🚩 : Presence is obligatory. / 🚩 : Presence is optional.

### Title

Activation cross sections of 7Li-induced reactions on natTi: Implications for monitor reactions

### Purpose

To measure the production cross sections of 54,52gMn, 51,49,48Cr, 48V, and 48,47,46Sc and the physical

### Authors Name and Affiliation ID Easy input

1: M.Aikawa	1	2	3
2: S.Goto	3		
3: D.Gantumur	3		

Unnecessary for EXFOR

Edit:  
e2798  
edit

Convert:  
e2798  
conv

NRDF  
w/o data  
CHEN  
EXFOR  
w/o data  
CHEX  
JANIS  
EXFOR+  
Graph

Bib  
Data 0A  
Data 0B  
Data 0X  
Data 1

E2798

Volume 559, 165579

Nucl. Instrum. Methods in Physics Res., Sect.B

2025

## Activation cross sections of 7Li-induced reactions on natTi: Implications for monitor reactions

M.Aikawa<sup>1,2,3</sup>, S.Goto<sup>3</sup>, D.Gantumur<sup>3</sup>, D.Ichinkhorloo<sup>4</sup>, N.Ukon<sup>5</sup>, N.Otuka<sup>6</sup>, S.Takacs<sup>7</sup>, H.Haba<sup>8</sup>

<sup>1</sup>Faculty of Science, Hokkaido University, Sapporo

<sup>2</sup>Faculty of Medicine, Hokkaido University, Sapporo

<sup>3</sup>Graduate School of Biomedical Science and Engineering, Hokkaido University, Sapporo

<sup>4</sup>Nuclear Research Center, National University of Mongolia, Ulaanbaatar

<sup>5</sup>Advanced Clinical Research Center, Fukushima Medical University, Fukushima

<sup>6</sup>Nuclear Data Section, International Atomic Energy Agency (IAEA), Vienna

<sup>7</sup>Institute for Nuclear Research (ATOMKI), Debrecen

ENTRY	E2798	20241228	E279800000001
SUBENT	E2798001	20241228	E279800100001
BIB	12	23	E279800100002
TITLE	Activation cross sections of 7Li-induced reactions on natTi: Implications for monitor reactions		E279800100003
AUTHOR	(M.Aikawa, S.Goto, D.Gantumur, D.Ichinkhorloo, N.Ukon, N.Otuka, S.Takacs, H.Haba)		E279800100004
INSTITUTE	(2JPNHOK, 3MGLNUM, 2JPNFMU, 3ZZZIAE, 3HUNDEB, 2JPNIPC)		E279800100005
REFERENCE	(J.NIM/B, 559, 165579, 2025)		E279800100006
INC-SOURCE	Beam intensity: 314, 321, and 309 nA, respectively.		E279800100007
SAMPLE	- Chemical-form of target is element.		E279800100008
	- Physical-form of target is solid.		E279800100009
	- Target-thickness: 2.34 mg/cm2 for cross sections and 22.7 mg/cm2 for thick target yields		E279800100010
METHOD	(ACTIV) Irradiated for 60, 60, and 30 min., respectively.		E279800100011
	(GSPEC)		E279800100012
FACILITY	(ISOCY, 2JPNIPC) AVF cyclotron		E279800100013
DETECTOR	(HRGS)		E279800100014
			E279800100015
			E279800100016
			E279800100017
			E279800100018



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# Web-based Editor for Nuclear Data (HENDEL)

## Target

Target Enrichment	<input type="text" value="none"/>	%	( <input type="text" value="none"/> )
Chemical Form	<input type="text" value="Element"/>		( <input type="text" value="none"/> )
Physical Form	<input type="text" value="Solid target"/>		( <input type="text" value="none"/> )
Target Thickness	<input type="text" value="X"/>	mg/cm <sup>2</sup>	( 2.34 mg/cm <sup>2</sup> for cross sections and 22.7 mg/cm <sup>2</sup> for thi )
Backing	<input type="text" value="none"/>		( <input type="text" value="none"/> )
Backing Thickness	<input type="text" value="none"/>	mg/cm <sup>2</sup>	( <input type="text" value="none"/> )
Target Polarization	<input type="text" value="0"/>	%	( <input type="text" value="none"/> )
Target Alignment	<input type="text" value="0"/>	%	( <input type="text" value="none"/> )

Options in EXFOR

## Accelerator

Accelerator Type and Institute (input from [Dictionary](#))

1:	<input type="text" value="Isochronous cyclotron"/>	( <input type="text" value="AVF cyclotron"/> )
Institute:	<input type="text" value="RIKEN (Inst. of Physical and Chemical Rese"/>	( <input type="text" value="none"/> )

ENTRY	E2798	20241228	E279800000001
SUBENT	E2798001	20241228	E279800100001
BIB	12	23	E279800100002
TITLE	Activation cross sections of <sup>7</sup> Li-induced reactions on natTi: Implications for monitor reactions		E279800100003
AUTHOR	(M. Aikawa, S. Goto, D. Gantumur, D. Ichinkhorloo, N. Ukon, N. Otuka, S. Takacs, H. Haba)		E279800100004
INSTITUTE	(2JPNHOK, 3MGLNUM, 2JPNFMU, 3ZZZIAE, 3HUNDEB, 2JPNIPC)		E279800100005
REFERENCE	(J, NIM/B, 559, 165579, 2025)		E279800100006
INC-SOURCE	Beam intensity: 314, 321, and 309 nA, respectively.		E279800100007
SAMPLE	- Chemical-form of target is element.		E279800100008
	- Physical-form of target is solid.		E279800100009
	- Target-thickness: 2.34 mg/cm <sup>2</sup> for cross sections and 22.7 mg/cm <sup>2</sup> for thick target yields		E279800100010
METHOD	(ACTIV) Irradiated for 60, 60, and 30 min., respectively.		E279800100011
	(GSPEC)		E279800100012
FACILITY	(ISOCY, 2JPNIPC) AVF cyclotron		E279800100013
DETECTOR	(URGE)		E279800100014
			E279800100015
			E279800100016
			E279800100017
			E279800100018





## New editor project launched

- In 2001, the HENDEL editor (beta version) was developed by Otsuka-san.
- As of 2025, JCPRG continues to use HENDEL for data compilation.
  - The JCPRG current compilers are graduate students with less EXFOR knowledge.
- A new EXFOR-oriented editor project has been launched, with valuable contributions from Suzuki-san, a master's course student.

