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A Bibliography and Index for Nuclear Reactions Among Light Charged Particles

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Foreword

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- Vol. 7, Part A, Rev. 1, *Major Neutron-Induced Interactions ($Z \leq 55$): Graphical, Experimental Data*, July 1976.

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- Vol. 26, A Bibliography and Index for Nuclear Reactions Among Light Charged Particles, September 1984.

A BIBLIOGRAPHY AND INDEX FOR NUCLEAR REACTIONS AMONG LIGHT CHARGED PARTICLES

Abstract

A bibliography of nuclear reactions induced by the light charged particles, p, d, t, ^3He , and α on primary target nuclei up through the isotopes of boron is given. A sorted index based on the type of nuclear reaction is also presented.

INTRODUCTION

A bibliography and index of experimental data from light charged particle induced nuclear reactions has been developed by searching the literature. To reduce both bulk and expense, this information is presented in the form of microfiche. Such data are useful for charged particle cross section evaluations and transport calculations. The incident particles considered were the five light isotopes p, d, t, ^3He , and α . The criterion for including a reference was that the reference contain information about, at least, one reaction induced by an ion of one of the five light isotopes impinging on a target nucleus lighter than ^{12}C . Once a reference was selected all reactions for target nuclei with $Z \leq 17$ were included. A further criterion for selection was that the incident particle energy be less than or equal to 20 MeV.

The bibliography, consists of 1303 separate entries and is sorted three ways:

- **Author Citations** arranges authors alphabetically, with associated reference numbers to data sets in which authors appear. A positive reference number indicates a primary reference and a negative reference number a secondary or cross reference. An asterisk following the reference number indicates first author for the reference.
- **References Ordered Alphabetically** arranges references and cross references in alphabetic order, with associated reference number, year, and authors. A positive reference number indicates a primary reference and a negative reference number a secondary or cross reference.
- **References Ordered Numerically** shows the contents of the bibliographic file, including all primary and secondary references and associated annotations which, in most cases are brief indexes to the data associated with the experiment. This index has a single line for each target and reaction, describing:

ZA Designation of a target nucleus by charge and mass ($1000 \cdot Z \cdot A$). For elements having mixtures of isotopes A is taken to be 0. Thus, natural boron has a ZA of 03000.

Y1 Numerical equivalent of the incident particle in the reaction. For definition of values see Table 1, which comes from the current ENDL system.¹

C Reaction identifier numerical equivalent. e.g., C-12 signifies a reaction resulting in two secondary neutrons. For definition of values see Table 2, again from ENDL.¹

DAT = 0 (or blank) Data given in reference.

= 1 No data given in reference.

The judgement of whether data are present in a reference is more subtle for charged particles than for neutron induced reactions. For example, data may here refer only to a single sentence in an article pertaining to a nuclear branching ratio.

An index to the nuclear reaction data is also given. It is sorted by target ZA number, incident particle designator (Y_1), reaction descriptor (C), and then the data sentinel (DAT).

TABLE 1. Particle Designator, y .^a

y	Particle
0	Not applicable ^b or none
1	n
2	p
3	d
4	t
5	³ He
6	α
7	γ
8	β^+
9	β^-
10	EC
11	Neutron as residual nucleus
12	Proton as residual nucleus
13	Deuteron as residual nucleus
14	Triton as residual nucleus
15	³ He as residual nucleus
16	α as residual nucleus

^a Used to identify both the incident particle, y_i , and the outgoing particle, y_o , to which any distribution data (e.g., energy, angle) pertain: $y_i = 0 - 7$ only; $y_o = 0 - 16$.

^b If no property (e.g., energy distribution) is given the y_o is zero or left blank in input. If y_i is zero or blank, the data which follow are nuclear structure data.

TABLE 2. Reaction Identifier C.

Kind of Data	C	Reaction type
Miscellaneous	1	Total ^a
	2-7	Unassigned
	8	Large angle Coulomb scattering
	9	Nuclear elastic plus interference
	10	Elastic
Neutrons + gammas only	11	$(\gamma_i, n'\gamma)$
	12	$(\gamma_i, 2n\gamma)$
	13	$(\gamma_i, 3n\gamma)$
	14	$(\gamma_i, 4n\gamma)$
	15	(γ_i, Xf) total fission
	16-19	Unassigned
Neutrons + charged particles + gammas	20	$(\gamma_i, n'p\gamma)$
	21	$(\gamma_i, pn'\gamma)$
	22	$(\gamma_i, n'd\gamma)$
	23	$[\gamma_i, n'd\alpha(\alpha)]$
	24	$(\gamma_i, n't\gamma)$
	25	$(\gamma_i, n'^3\text{He}\gamma)$
	26	$(\gamma_i, n'\alpha\gamma)$
	27	$[\gamma_i, n'2\alpha(\alpha)]$
	28	$[\gamma_i, n't\alpha(\alpha)]$
	29	$(\gamma_i, 2np)$
	30	$(\gamma_i, \gamma n\alpha)$
	31	$[\gamma_i, 2n\alpha(\alpha)]$
	32	$[\gamma_i, 2nd(\alpha)]$
	33-36	Unassigned
Charged particle and/or gamma formation	37	$[\gamma_i, 2\alpha(\alpha)]$
	38	$[\gamma_i, ^3\text{He}\alpha(\alpha)]$
	39	$[\gamma_i, pt(\alpha)]$
	40	$(\gamma_i, p\gamma)$
	41	$(\gamma_i, d\gamma)$
	42	$(\gamma_i, t\gamma)$

TABLE 2. Continued

Kind of Data	C	Reaction type
Particle or gamma production	43	$[y_1, \alpha(\alpha)]$
	44	$(y_1, {}^3\text{He}\gamma)$
	45	$(y_1, \alpha\gamma)$
	46	(y_1, γ)
	47-49	Unassigned
	50	(y_1, Xp)
	51	(y_1, Xd)
	53	$(y_1, X{}^3\text{He})$
	54	$(y_1, X\alpha)$
	55	$(y_1, X\gamma)$
	56	(y_1, Xn)
	57	$(y_1, X\beta^-)$
	58-64	Unassigned
	65	Activation (undefined reaction)
	66-69	Unassigned

^a Not stored in the system, but obtained for output display and transmission format by combining other data.

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