

REACTION SPECIFICATION

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Reaction Specification

Coding of nuclides and compounds

General format Z-S-A-X

for compounds: A is replaced by compound code

- G for ground state
(for nucleus with known metastable state)
- M if only one known metastable state
- M1 for the 1st metastable state
- M2 for the 2nd, *etc.*
- T for sum of all isomers (SF 4)

Reaction Specification

Examples:

14-SI-28

95-AM-242-M

Z-S-A-G+M1 / T

26-FE-OXI

Forbidden:

Z-S-A-G+M

Reaction Specification

REACTION

(reaction, quantity, data type)

Quantity field: SF1,SF2,SF3,SF4

SF1: target

SF2: incident projectile

SF3: outgoing particles

SF4: reaction product

13-AL-27(N,P)12-MG-27

Reaction Specification

REACTION SF1 (target)

- *Z-S-A-M*

A = 0 denotes natural isotopic mixture

M may not have value *G*

- or *Z-S-A-cmp*
- or *ELEM/MASS*, variable target nucleus

Reaction Specification

REACTION SF2 (incident projectile)

- particle code
- or *Z-S-A-M* (for particles heavier than α)

Reaction Specification

REACTION SF3 (outgoing particles)

- process code, *e.g.*, TOT,
- particle code + multiplicity (if >1), *e.g.*, 4A,
- Z-S-A-M (for particles heavier than α)
- or a combinations of the above, connected with +

Example: HE3+8-0-16.

Reaction Specification

REACTION SF4 (reaction product)

- Z-S-A-M (for all particles), *e.g.*, 0-NN-1
- or blank (for specific reactions), *e.g.*, SF3 = TOT
- or ELEM/MASS, variable product nucleus
- or NPART, variable number of emitted particles

Special case

- for scattering on natural isotopic mixture:
use $A = 0$.

Reaction Specification

REACTION

(reaction, quantity, data type)

Quantity field: SF5,SF6,SF7,SF8

Each field may have multiple codes, separated by '/'.
/

SF5: branch (may be blank)

SF6: parameter

SF7: particle considered (may be blank)

correlated particles separated by +, *e.g.*, P+A

SF8: modifier (may be blank)

Reaction Specification

REACTION

(reaction, quantity, data type)

Data type field: SF9 (blank = EXP)

DERIV

Examples of REACTION strings

(5-B-10(N,A+T)2-HE-4,SEQ,SIG)

(28-NI-0(N,X)0-G-0,,SIG)

Reaction Specification

REACTION combinations

$$((\text{-----}) + (\text{-----}))$$

$$((\text{-----}) - (\text{-----}))$$

$$((\text{-----}) * (\text{-----}))$$

$$((\text{-----}) / (\text{-----}))$$

$$((\text{-----}) / / (\text{-----}))$$

$$((\text{-----}) = (\text{-----}))$$

Reaction Specification

REACTION combinations

((92-U-235(N,F),,SIG)/(79-AU-197(N,G)79-AU-198,,SIG))

((28-NI-58(N,N+P)27-CO-57,,SIG)+(28-NI-58(N,D)27-CO-57))

((3-LI-7(D,P)3-LI-8,,SIG)//(3-LI-7(P,N)4-BE-7,,SIG))

to be used with independent variable headings with extensions -NM for numerator and -DN for denominator

Reaction Specification

Multiple Reaction Formalism.

- pointers are used with the reaction keyword,
- code fields associated with pointers may be reaction unit or reaction combination
- use restricted to specific classes of data.
 - Incident projectile and target same,
 - Quantities functions of same independent variables,
 - Quantities are integrally related.

Reaction Specification

Variable Product Nucleus

Nuclei that are entered as variables in the data table.

SF1 or SF4 contain:

- ELEM - if Z of nuclide given in data table.
- MASS - if A of nuclide given in data table.
- ELEM/MASS - if Z and A of nuclide given in data table

Nuclei are entered in the common data or data table as variables with data headings ELEMENT and/or MASS with units NO-DIM.

Reaction Specification

Variable Product Nucleus

BIB

REACTION (... (... , F) ELEM / MASS , ...)

ENDBIB

NOCOMMON

DATA

ELEMENT

MASS

ISOMER

DATA

NO-DIM

NO-DIM

NO-DIM

PC / FIS

61 .

148 .

0 .

...

61 .

148 .

1 .

...

61 .

149 .

...

...

...

...

Reaction Specification

Variable Number of Emitted Nucleons

Number of particles is entered as a variable in the data table.

BIB

REACTION (... (... , X) NPART , NUM , SIG , P)

ENDBIB

NOCOMMON

DATA

EN

PART-OUT

DATA

MEV

NO-DIM

MB

...

2.

...

...

3.

...

...

...

...

Reaction Specification

RESULT

Describes commonly used quantities that are coded as REACTION combinations.

```
REACTION      ( ( ( Z-S-A(N,EL) , , WID , , G ) * ( Z-S-A(N,G) , , WID ) ) /  
              ( Z-S-A(N,TOT) , , WID ) )  
RESULT        ( CAPTA )
```