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International Atomic Energy Agency
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Memo CP-D/710

Date: 11 August 2011
To: Distribution
From: N. Otsuka

Subject: Total mass yield (MAS,FY)

From the description of LEXFOR “Fission Yields” (See Appendix of the memo), the following two quantities are equivalent

(... (N, F) MASS, SEC, FY) Post-neutron-emission fission-product yield
(... (N, F) MASS, MAS, FY) Mass yield of fission fragment as sum of independent yield

Both REACTION codes give the sum of independent yields of all fission products with a given mass. There are only 7 data sets coded with MAS (introduced in February 2000) and they were checked.

Entry	REACTION (SF5-SF8)	Comments
13981.002	MAS, FY	Use PRE, FY (declared as <i>pre-neutron-emission mass-yield</i> by authors)
14044.003	PAR/MAS, FY, LF, REL/MXW	Use SEC, FY/DE, *F, MXW/MSC (declared as <i>post-neutron-emission masses</i> by authors)
14088.002	MAS, FY	?
14088.003	MAS, FY	?
41496.003	MAS, FY	Use SEC, FY (They obtained $\langle A_L \rangle + \langle A_H \rangle = 240.6$, which is smaller than the compound mass.)
A0108.245	MAS, FY	Use SEC, FY (on-line separation at GSI)
O1442.002	MAS, FY	Use SEC, FY ? (I cannot find an answer in the article.)

Many of these authors use “mass yields” in their figures, and this is probably the reason why compilers selected MAS, FY. This is a good example to learn that selection of quantity codes should not be based on the terminology but on the definition of the quantity.

I propose to make the following 3 codes obsolete.

Dictionary 31 (Branch Codes)

MAS *Obsolete*

Dictionary 31 (Branch Codes)

MAS, FY *Obsolete*

PAR/MAS, FY, LF *Obsolete*

Appendix (Extraction from LEXFOR “Fission Yields”)

Secondary Fission-Fragment Yield

The secondary yield per fission of fission-fragment mass A after prompt-neutron emission, but before β decay and delayed-neutron emission. It may also be called post-neutron-emission fragment-mass distribution

Example: (... (N, F) MASS, SEC, FY)

Independent Fission-Product Yield

The direct or independent yield per fission of a primary fission product specified by Z and A ; i.e., after prompt neutron emission, but before β decay and delayed-neutron emission, including only the direct yield and not the yield obtained from decay of other fission products.

Example: (... (N, F) ELEM/MASS, IND, FY)

Total Mass Yield

The total mass yield per fission of fragment mass A is the sum of the independent yields of all fission products with the mass A .

Example: (... (N, F) MASS, MAS, FY)

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