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Memo CP-D/359

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To: Distribution

From: O. Schwerer

Subject: **Partial cross section for production of specified number of product particles**

Reference: Subentry A0361.002 (TRANS A054) and related comments

In this work, partial cross sections for the production of a specified number of heavy product particles from the reaction U-238 incident on Au-197 at 3570 MeV are measured.

In subentry A0361.002 (on TRANS A054) this is coded as

(1) (79-AU-197 (92-U-238 , F) , , SIG/DN , FF)

with PART-OUT as independent variable and DATA in units MB/PRT.

In V. McLane's comment on TRANS A054 it is mentioned that

- SIG/DN is not appropriate because DN stands for "differential with respect to number of outgoing neutrons" while here all (heavy) product particles are included, and
- SF3 = F (fission) is not appropriate because according to the publication, not only fission is included,

and a new way of coding was proposed:

(2) (79-AU-197 (92-U-238 , X) NPART , , SIG)

(to be given in units MB), introducing a new code NPART for SF4.

(Note that there is no dictionary for SF4. Like ELEM and MASS, such special codes need to be hard-wired into all relevant programs.)

While I agree that the original coding needs to be replaced by something new, I am not happy with using the simple quantity (REACTION SF5-8)

, SIG (dictionary 36 entry for a straightforward cross section)

because we have here a partial cross section with an additional independent variable (PART-OUT). Since the checking programs check the consistency of quantities, variables and units based on dictionary 36 (which does not include SF4), I prefer a solution with a new code not only in SF4 but also in SF5 and/or SF6, to enable proper checking. For example:

(3) (79-AU-197 (92-U-238 , X) HFRAG , NUM , SIG)

NUM and NUM , SIG, respectively, would be added to **dictionaries 31** and **36** as "partial cross section for production of specified number of product particles".

Also, I propose to replace NPART by HFRAG (for heavy fragment) to indicate that these are not e.g. neutrons or protons which would be coded with a proper nuclide code.

In any case, any new special code for SF4 (such as NPART or HFRAG) will have to be added to the EXFOR Systems Manual (Chapter 7 on REACTION, Section on Reaction Product).

There might be still other, perhaps better ways of coding such data. Please give your feedback.

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