Nuclear Data Section
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Memo CP-D/893

Incident Energy differential physical thick target yield

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Thin target excitation functions for (α, *x*n) reactions on osmium targets for platinum radiotracer production

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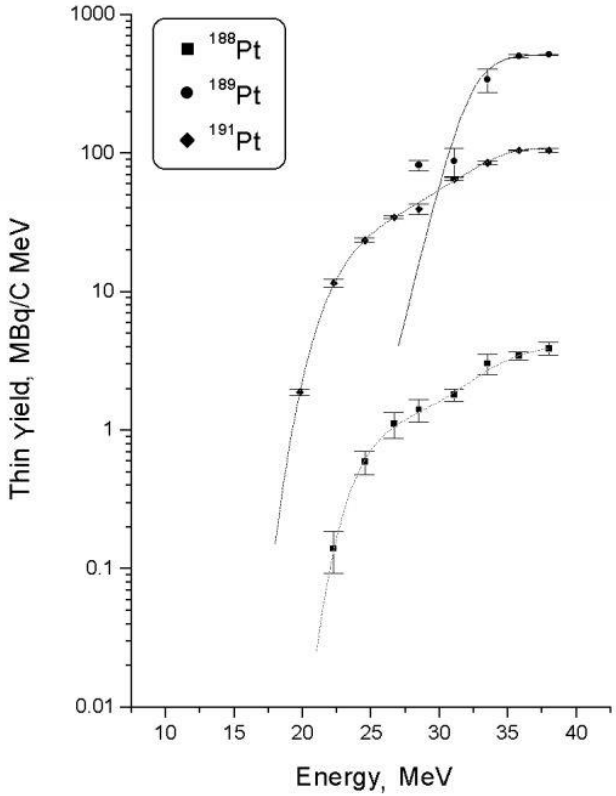

Fig. 2. Thin target excitation functions for the $^{nat}Os(\alpha,xn)^{188}Pt$, ^{189}Pt and ^{191}Pt nuclear reactions

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Thin-target excitation functions and optimisation of NCA ^{64}Cu and ^{66,67}Ga production by deuteron induced nuclear reactions on natural zinc target, for radiometabolic therapy and for PET

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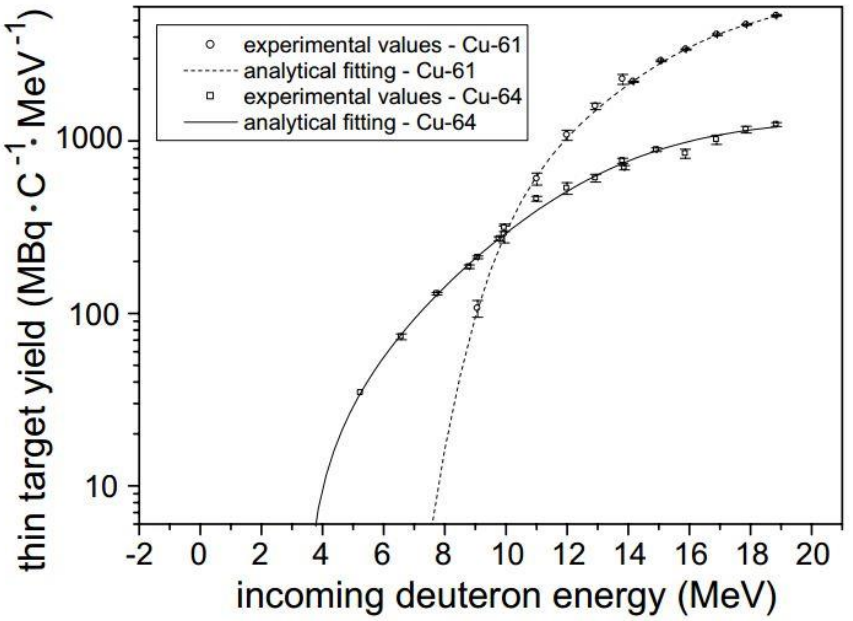

Fig. 1. Thin-target excitation functions of ^{64}Cu and ^{61}Cu, experimentally determined, as a function of incident deuteron energy (1 RSD).

The actual meaning of this quantity is the **differential of the physical thick target yield with respect to the incident energy**.

LEXFOR: “Thick- and Thin-Target Yields” explains that the
production thick target yield per 1 MeV of target thickness
Coded: in REACTION SF6-SF8 with TTY,,TM
The unit code with dimension TTTE (e.g., CI/AHR/MEV).

As mentioned in Memo CP-A/155, this quantity has been typically seen in articles reporting charged-particle induced reaction activation experiments by the Milan group (M. Bonardi et al.).

REACTION (76-OS-0(A,X)78-PT-191,,TTY,,TM)

There are: **11** ENTRYs
69 SUBENTRYs

Dictionary 36:

,TTY,,TM	**Production thick target yield (decay rate per unit of beam current * time) for 1 MeV target thickness**

The physical thick target yield for the initial particle energy of E is:

$$Y(E) \approx \int_{E_1}^{E_2} \sigma\left(E'\right)\left[\frac{dE}{dX}\left(E'\right)\right]^{-1} dE'$$

$$S = \frac{dE}{dX}$$

The energy differential is:

$$\frac{dY(E)}{dE} = \frac{d}{dE}\int_{E_1}^{E_2} \sigma\left(E'\right)\left[-\frac{1}{\rho}\frac{dE}{dX}\left(E'\right)\frac{1}{Ze}\right]^{-1} dE' = \sigma\left(E\right)\left[-\frac{1}{\rho}\frac{dE}{dX}\left(E\right)\frac{1}{Ze}\right]^{-1}$$

where E is not a secondary energy but the incident energy.

The actual meaning of this quantity is the **differential of the physical thick target yield with respect to the incident energy**.

This equation implies that we can derive the cross section σ(E) by measuring the physical thick target yield at various incident energies.

Proposed revision of LEXFOR

Production Thick Target Yield per 1 MeV of Target Thickness
REACTION Coding: ,TTY,,TM .

Units: a code from Dictionary 25 with dimension TTTE, *e.g.*, CI/AHR/MEV

New content :

Physical Thick Target Yields Differential with respect to Incident Energy
REACTION Coding: ,TTY/DEN,,PHY .

Units: a code from Dictionary 25 with dimension TTTE, *e.g.*, MBQ/C/MEV

Coding:

REACTION (76-OS-0(A,X)78-PT-191,,TTY/DEN,,PHY)