Correction of datasets having zero values

(N. Otsuka, 2025-02-25, Memo CP-D/1126)

Following the recommendation to NDS from the Vienna EXFOR workshop 2024 "*Register some items in Tables 2 to Table 5 of WS2024-02 to the EXFOR Feedback List.*", I went through Tables 2 and 3 of the working paper (=Memo 4C-4/0242) and registered selected items in the Feedback List as summarized at the end of this memo.

The scattering cross sections measured with neutrons from the Munich research reactor and published by Koester et al. are often the scattering cross sections <u>at zero energy</u>.

Example: Extraction from W. Waschkowski et al., Z. Naturforsch. A 31(1976)115 (EXFOR 20603):

greater than the statistical error. The more accurate measurements on li(
following scattering cross sections of free atoms for neutrons of <u>zero energy</u>:

Lead: $\sigma_0(\text{Pb}) = (11.261 \pm 0.006)\ b$,
Bismuth: $\sigma_0(\text{Bi}) = (9.300 \pm 0.003)\ b$, and
Sulfur: $\sigma_0(\text{S}) = (0.985 \pm 0.004)\ b$.

Damit ergibt sich der Streuquerschnitt eines freien Kerns mit n Resonanzen zu

$$\sigma_{\text{frei}}(E) = 4\,\pi\,a(E)^2 \qquad (2)$$

$$= 4\,\pi\,a_0{}^2\left[1 + \sum_{r=1}^{n} \frac{a_{0r}}{a_0}\cdot\frac{E}{(E-E_r)}\right]^2.$$

<u>Für $E=0$ wird der freie Streuquerschnitt $\sigma_0 = 4\pi</u> \cdot \underline{a_0{}^2}$ erhalten. Gleiche Beziehungen gelten für Kerne

EN=0 is possible for compilation of σ_0. The same argument is also applied to EXFOR 23747 (from a J-PARC measurement.)

Items registered in the EXFOR Feedback List (Italicized items were not registered.)

Table 2 of Memo 4C-/0424

Dataset #	Registered correction proposal (*or remark if not registered*)
14709.011.5	REACTION SF6: PTY -> L (c.f. Table IV)
22602.002.3	REACTION SF6: PTY -> L? (c.f. Mughabghab's Atlas. Source document kept at NEA DB?)
T0246.008.3	Data: Replace "0" with a blank (c.f. Table I)

Table 3 of Memo 4C-/0424

Dataset #	Registered correction proposal (*or remark if not registered*)
11557.003	*(Is the neutron energy potential scattering cross section?)*
12629.002	*(Prompt gamma emission probability of thermal neutron capture)*
14239.022, 035,044	Data: Delete lines filled by zero values at the end of the DATA section.
14316.004-005	*(Digitized neutron energy from Fig.7 can be zero after rounding.)*

14570.002	Data: EN=0.0 -> EN-MIN/MAX=0.0/0.5; EN=0.5 -> EN-MIN/MAX=0.5/1.0;...; EN=20.0 -> EN-MIN/MAX=20.0/20.5 (c.f. Fig.7).
14687.003	Data: EN: Negative energy is impossible from digitization of Fig.11. (N.B. x-axis is not linear of energy)
14688.002	Data: EN: Negative energy is impossible from digitization of the figure. (N.B. x-axis is not linear of energy)
20603.003, 005,007	(*from Koester's group*)
21660.024-027	(*from Koester's group*)
21842.024-028	(*from Koester's group*)
22104.003,005	(*from Koester's group*)
22138.006	(*from Koester's group*)
22217.002-003	(*from Koester's group*)
23747.002-005	(*EN=0 agreed with the compiler.*)
40429.002,004	(*Corrected in TRANS.4217*)
A0945.004-005	REACTION SF9: Add DERIV with an explanation of its derivation under ANALYSIS.
A1258.002	REACTION SF9: Add DERIV with an explanation of its derivation under ANALYSIS.
A1436.002-003	(*EVALuated datasets*)
A1459.002	(*CALCulated dataset*)
C0174.003	REACTION SF9: Add DERIV. METHOD -> ANALYSIS.
C0720.004,007	Data: Move EN=0 data point to ADD-RES? No such a point seen in Fig.5 and no description on extrapolation.
C1290.002-005	REACTION: Move free text under ANALYSIS.
C2598.006	REACTION SF9: Add DERIV.
D0002.006	Heading: Swap EN and ANG-CM.