**Nuclear Data Section**

**International Atomic Energy Agency**

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**Memo CP-D/1060**

**Date:** 7 November 2022

**To:** Distribution

**From:** A. Rodrigo, N. Otsuka

**Subject: EXFOR errors detected during calculation of isomeric ratios (2)**

**Reference:** Memo CP-D/1058

After submission of Memo CP-D/1058, we changed our source of isomer production cross sections from the C5 library to X4Pro Ver. STUD1-2022-08-26 [V.Zerkin, Private communication, 2022] and found some calculated isomeric ratios not satisfying 0 < σM/σT < 1 and not reported in CP-D/1058. We checked each case against the source article, and summarized required corrections as appended to this memo.

A typical source of troubles is absence of “g” in the nuclide symbol for tabulation of ground state production cross sections (e.g., “102Rh” instead of “102gRh” for tabulation of 102gRh production cross section.) See a table taken from the EXFOR C0263 article as an example (This is smaller than 102mRh production cross section and probably 102gRh production cross section). There might be more ground state production cross sections compiled as total production cross sections in EXFOR but not detectable by us. We urge the experimentalists use “g” and “g+m” in the cross section tables to avoid such an ambiguity.



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**Table: Isomer production cross section larger than the total production cross section** (Error: EXFOR compilation error. (G), (M) and (T) following the subentry number indicate that the ground state production, metastable state production and total production cross section is compiled, separately.)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author (year)** | **Dataset 1** | **Dataset 2** | **Error?** | **Remark** |
| Y.Kanda (1972) | 20338.008(M) | 20338.010(T) | No | Compiled as published. |
| Y.Kanda (1972) | 20338.013(M) | 20338.015(T) | Yes | 013: Delete ERR-T=25.4% in COMMON. |
| W.Poenitz (1966) | 21193.007(G) | 21193.002(T) | Yes | 79-AU-198-G -> 79-AU-198 in SF4 through this entry. Also check if only final values are compiled as active data. |
| B.N.Beljaev+ (1978) | A0041.002.A(G) | A0041.004(T) | Yes | 002.A: Delete ISOMER=0 for 37-RB-84, 39-Y-86 and 39-Y-88. |
| B.N.Beljaev+ (78) | A0041.002.C(G) | A0041.006(T) | Yes | 002.C: Delete ISOMER=0 for 37-RB-84, 39-Y-86 and 39-Y-88. |
| Yu.E.Titarenko+ (2011) | A0906.152(M) | A0906.154(T) | Yes? | 154: The 799 and 1199 MeV in Table3 could be for g.s. only. Question sent to Titarenkov (2022-10-23). |
| N.T.Porile+ (1979) | C0263.003(M) | C0263.003(T) | No? | “102Rh” in Table1 means “102gRh” rather than “102g+mRh”? The table notation looks inconsistent. |
| N.T.Porile+ (1979) | C0263.005(M) | C0263.005(T) | No? | “44Sc” in Table1 means “44gSc” rather than “44g+mSc”? The table notation looks inconsistent. |
| N.T.Porile+ (1979) | C0263.005(M) | C0263.005(T) | No? | “99Rh” in Table1 means “99gRh” rather than “99g+mRh”? The table notation looks inconsistent. |
| R.T.Skelton+ (1987) | C0304.003(M) | C0304.002(T) | Yes | Under revision in PRELIM.C220. |
| R.T.Skelton+ (1987) | C0304.005(G) | C0304.002(T) | Yes | Under revision in PRELIM.C220. |
| R.T.Skelton+ (1987) | C0304.007(M) | C0304.006(T) | Yes | Under revision in PRELIM.C220. |
| R.T.Skelton+ (1987) | C0304.009(G) | C0304.006(T) | Yes | Under revision in PRELIM.C220. |
| J.Jastrzebski+ (1986) | C0306.003(G) | C0306.002(T) | No | 003 from off-line measurement while 002 from on-line measurement. |
| E.Gadioli+ (1984) | C0312.002(M) | C0312.002(T) | Yes | Add ISOMER=0 for all ground state production cross sections. |
| E.Gadioli+ (1984) | C0312.003(M) | C0312.003(T) | Yes | Add ISOMER=0 for all ground state production cross sections. |
| E.Gadioli+ (1984) | C0312.004(M) | C0312.004(T) | Yes | Add ISOMER=0 for all ground state production cross sections. |
| E.Gadioli+ (1984) | C0312.005(M) | C0312.005(T) | Yes | Add ISOMER=0 for all ground state production cross sections. |
| E.Gadioli+ (1984) | C0312.006(M) | C0312.006(T) | Yes | Add ISOMER=0 for all ground state production cross sections. |
| E.Gadioli+ (1984) | C0312.007(M) | C0312.007(T) | Yes | Add ISOMER=0 for all ground state production cross sections. |
| N.T.Porile (1962) | C0343.009(M) | C0343.008(T) | Yes | 008: Add -G in SF4. |
| N.T.Porile (1962) | C0343.009(M) | C0343.010(T) | No | Compiled as published. |
| N.T.Porile (1962) | C0343.019(G) | C0343.008(T) | Yes | 008: Add -G in SF4. |
| N.T.Porile (1962) | C0343.020(M) | C0343.008(T) | Yes | 008: Add -G in SF4. |
| N.T.Porile (1962) | C0343.020(M) | C0343.010(T) | No | Compiled as published. |
| N.T.Porile (1962) | C0343.028(M) | C0343.008(T) | Yes | 008: Add -G in SF4. |
| P.A.Beeley+ (1983) | C0492.003(M) | C0492.005(T) | No | Compiled as published in thesis. |
| D.W.Bardayan+ (1997) | C1944.003(G) | C1944.003(T) | Yes | MASS=85 -> 86 for 19.0+/-1.0 mb (c.f. Table IV) |
| A.F.Barghouty+ (2013) | C1977.004(M) | C1977.004(T) | Yes? | 002, 004: Add ISOMER=0 to “102Rh” cross section in Table 2? Question sent to Fiorini (2022-10-23). |
| G.English+ (1974) | C2340.003(M) | C2340.003(T) | No? | “44Sc” in Table1 means “44gSc” rather than “44g+mSc”? |
| G.English+ (1974) | C2340.003(?) | C2340.003(T) | No? | “102Rh” in Table1 means “102gRh” rather than “102g+mRh”? |
| I.Leya (1997) | D0640.035(M) | D0640.035(T) | Yes | “102Rh” in Table1 means “102gRh” rather than “102g+mRh”. Confirmed by Michel (2022-10-24). |
| F.Tarkanyi+ (2004) | D4143.008.2(M) | D4143.008.1(T) | No | Compiled as published. Takacs confirmed there is no mistake (2022-10-24). |
| K.Hilgers+ (2007) | D4197.005(M) | D4197.006.1(T) | Yes | 006.1: Add -G in SF4. |
| T.Tominaka+ (1984) | E1882.002(M) | E1882.002(T) | No? | “86Y” in Table1 means “86gY” rather than “86g+mY”?. |
| H.Baba+ (1996) | E2036.002(M) | E2036.002(T) | No | Compiled as published (“g+m” explicitly printed.) |
| H.Baba+ (1996) | E2036.005(M) | E2036.005(T) | No | Compiled as published (“g+m” explicitly printed.) |
| H.Baba+ (1996) | E2036.005(M) | E2036.006(T) | Yes | 006: Add CUM in SF5. |
| H.Baba+ (1996) | E2036.005(M) | E2036.005(G) | No | Compiled as published. |
| S.A.Karamian+ (2004) | O0800.004(M) | O0800.004(T) | No? | “174Lu” in Tables1 and 2 means “174gLu” rather than “174g+mLu”?. Question sent to CNPD (2022-10-23) |
| S.A.Karamian+ (2004) | O0800.005(M) | O0800.005(T) | No? | “174Lu” in Tables1 to 3 means “174gLu” rather than “174g+mLu”?. Question sent to CNPD (2022-10-23). |
| Yu.E.Titarenko (2001) | O0986.002(M) | O0986.002(T) | No | Compiled as published. |
| R.Bimbot+ (1966) | O2011.003(<) | O2011.002(T) | No | Compiled as published. |
| R.Debuyst+ (1968) | O2031.008(M) | O2031.006(T) | Yes | 006: Add -G in SF4 (c.f G/M ratio in 013) |
| J.Wing+ (1962) | T0124.003.M(M) | T0124.003.S(T) | Yes | 003.S compiles values calculated by the compiler, and must be deleted (two points at 5.8 MeV) |