**152**

63

Eu

89

# Decay Scheme

## Eu-152 disintegrates 72.1% by electron-capture and about 0.027% by emission of positrons to Sm-152 and by beta minus emission (27.9%) to Gd-152.

*L’europium 152 se d´esint`egre par capture ´electronique (72,1%) et par ´emission de positron (environ 0,027%) vers le samarium 152 et par ´emission bˆeta moins (27,9%) vers le gadolinium 152.*

# Nuclear Data

|  |  |  |
| --- | --- | --- |
| *T*1*/*2(152Eu ) : | 13,522 (16) | a |
| *Q−*(152Eu ) : | 1818,8 (11) | keV |
| *Q*+(152Eu ) : | 1874,3 (7) | keV |

* 1. **Electron Capture Transitions**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Energy Probability Nature lg *ft PK PL PM*  keV *×* 100 | | | | | | | | | | | | |
| *ϵ*0*,*19 | 105,2 | (7) | 0,068 | (5) | 1st Forbidden | 10,3 | 0,6586 | (33) | 0,2591 | (24) | 0,0657 | (12) |
| *ϵ*0*,*18 | 117,1 | (7) | 0,041 | (3) | 1st Forbidden | 10,7 | 0,6903 | (28) | 0,2358 | (20) | 0,0591 | (11) |
| *ϵ*0*,*17 | 144,1 | (7) | 0,0422 | (12) | (Allowed) | 10,9 | 0,7339 | (23) | 0,2036 | (16) | 0,0499 | (9) |
| *ϵ*0*,*16 | 224,4 | (7) | 0,889 | (14) | Allowed | 10,1 | 0,7859 | (19) | 0,1651 | (13) | 0,0392 | (7) |
| *ϵ*0*,*15 | 261,4 | (7) | 0,0208 | (14) |  | 11,9 | 0,7966 | (18) | 0,1571 | (13) | 0,0370 | (7) |
| *ϵ*0*,*14 | 294,9 | (7) | 2,068 | (12) | Allowed | 10 | 0,8036 | (17) | 0,1519 | (12) | 0,0356 | (7) |
| *ϵ*0*,*13 | 344,5 | (7) | 24,72 | (11) | Allowed | 9,1 | 0,8109 | (17) | 0,1465 | (12) | 0,0341 | (7) |
| *ϵ*0*,*12 | 502,6 | (7) | 0,869 | (24) | 1st Forbidden | 10,9 | 0,8236 | (16) | 0,1370 | (11) | 0,0316 | (6) |
| *ϵ*0*,*11 | 581,5 | (7) | 0,644 | (10) | (1st Forbidden) | 11,2 | 0,8271 | (16) | 0,1344 | (11) | 0,0309 | (6) |
| *ϵ*0*,*10 | 640,4 | (7) | 17,16 | (8) | 1st Forbidden | 9,8 | 0,8291 | (16) | 0,1329 | (11) | 0,0305 | (6) |
| *ϵ*0*,*9 | 788,5 | (7) | 21,35 | (11) | 1st Forbidden | 9,9 | 0,8327 | (15) | 0,1302 | (11) | 0,0297 | (6) |
| *ϵ*0*,*8 | 833,2 | (7) | 0,086 | (7) | Allowed | 12,4 | 0,8335 | (15) | 0,1296 | (11) | 0,0296 | (6) |
| *ϵ*0*,*7 | 851,3 | (7) | 0,238 | (5) | 1st Forbidden | 11,9 | 0,8338 | (15) | 0,1294 | (11) | 0,0295 | (6) |
| *ϵ*0*,*5 | 1063,9 | (7) | 1,28 | (3) | 1st Forbidden | 11,4 | 0,8366 | (15) | 0,1273 | (11) | 0,0290 | (6) |
| *ϵ*0*,*2 | 1507,8 | (7) | 0,77 | (5) | 1st Forbidden | 12 | 0,8398 | (15) | 0,1249 | (11) | 0,0283 | (5) |
| *ϵ*0*,*1 | 1752,5 | (7) | 1,7 | (10) | 1st Forbidden | 11,8 | 0,8408 | (15) | 0,1241 | (10) | 0,0281 | (5) |

* 1. *β*+ **Transitions**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Energy keV | | Probability  *×* 100 | Nature | lg | *ft* |
| *β*+  0*,*2  *β*+  0*,*1 | 485,8 (7) | 0,0024 (2) | 1st Forbidden | | |
| 730,5 (7) | 0,025 (15) | 1st Forbidden | | |

* 1. *β−* **Transitions**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Energy Probability Nature lg *ft*  keV *×* 100 | | | | | | |
| *β*0*−,*15 | 126,4 | (11) | 0,0203 | (11) | 1st Forbidden | 11,1 |
| *β*0*−,*14 | 175,4 | (11) | 1,826 | (21) | Allowed | 9,6 |
| *β*0*−,*13 | 213,5 | (11) | 0,101 | (3) | 1st Forbidden | 11,1 |
| *β*0*−,*12 | 268,6 | (11) | 0,0536 | (18) | 1st Forbidden | 11,7 |
| *β*0*−,*11 | 384,8 | (11) | 2,44 | (3) | 1st Forbidden | 10,5 |
| *β*0*−,*10 | 500,3 | (11) | 0,0267 | (17) | 1st Forbidden | 12,9 |
| *β*0*−,*9 | 504,1 | (11) | 0,0048 | (7) | 2nd Forbidden | 13,6 |
| *β*0*−,*8 | 536,5 | (11) | 0,037 | (8) | 1st Forbidden | 12,8 |
| *β*0*−,*7 | 695,6 | (11) | 13,80 | (15) | Allowed | 10,6 |
| *β*0*−,*6 | 709,7 | (11) | 0,245 | (8) | 1st Forbidden | 12,4 |
| *β*0*−,*4 | 888,2 | (11) | 0,303 | (7) | 1st Forbidden | 12,7 |
| *β*0*−,*3 | 1063,4 | (11) | 0,904 | (14) | 1st Forbidden | 12,5 |
| *β*0*−,*1 | 1474,5 | (11) | 8,17 | (11) | 1st Forbidden | 12,1 |

# Gamma Transitions and Internal Conversion Coefficients

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Energy P*γ*+ce Multipolarity *αK αL αM αT*  keV *×* 100 (10*−*3) (10*−*3) | | | | | | | | | | | | |
| *γ*1*,*0(Sm) | 121,7818 | (3) | 61,5 | (10) | E2 | 0,676 | (20) | 378 | (11) | 87,5 | (26) | 1,165 (35) |
| *γ*5*,*3(Sm) | 125,69 | (13) | 0,038 | (13) | (E2) | 0,616 | (18) | 329 | (10) | 76,0 | (23) | 1,042 (31) |
| *γ*10*,*9(Sm) | 148,010 | (17) | 0,055 | (8) | (M1+50%E2) | 0,430 | (13) | 115,0 | (34) | 26,0 | (8) | 0,578 (17) |
| *γ*7*,*4(Gd) | 192,6 | (4) | 0,00714 | (22) | (E1) | 0,0426 | (13) | 6,09 | (18) | 1,32 | (4) | 0,0504 (15) |
| *γ*14*,*12(Sm) | 207,6 | (3) | 0,0062 | (4) | (E1) | 0,0327 | (10) | 4,55 | (14) | 0,975 | (29) | 0,0385 (12) |
| *γ*14*,*11(Gd) | 209,41 | (13) | 0,0058 | (5) | (E1) | 0,0342 | (10) | 4,86 | (15) | 1,050 | (32) | 0,0404 (12) |
| *γ*7*,*5(Sm) | 212,568 | (15) | 0,0229 | (8) | E2 | 0,1244 | (37) | 36,4 | (11) | 8,25 | (25) | 0,171 (5) |
| *γ*(*−*1*,*0)(Sm) | 237,3 | (1) | 0,0026 | (9) | (E1) | 0,0231 | (7) | 3,18 | (10) | 0,681 | (20) | 0,0272 (8) |
| *γ*19*,*13(Sm) | 239,42 | (17) | 0,008 | (3) | (E1) | 0,0225 | (7) | 3,11 | (9) | 0,665 | (20) | 0,0265 (8) |
| *γ*2*,*1(Sm) | 244,6976 | (8) | 8,37 | (5) | E2 | 0,0809 | (24) | 21,1 | (6) | 4,75 | (14) | 0,1080 (32) |
| *γ*11*,*8(Sm) | 251,633 | (7) | 0,0687 | (15) | (E1) | 0,0198 | (6) | 2,72 | (8) | 0,583 | (17) | 0,0233 (7) |
| *γ*11*,*7(Sm) | 269,86 | (6) | 0,006 | (3) | (E2) | 0,0602 | (18) | 14,60 | (44) | 3,27 | (10) | 0,0789 (24) |
| *γ*2*,*1(Gd) | 271,131 | (8) | 0,084 | (3) | E2 | 0,0621 | (19) | 16,20 | (49) | 3,70 | (11) | 0,0831 (25) |
| *γ*9*,*5(Sm) | 275,449 | (15) | 0,0357 | (19) | (M1) | 0,0887 | (27) | 12,30 | (37) | 2,65 | (8) | 0,1044 (31) |
| *γ*12*,*9(Sm) | 285,98 | (3) | 0,0107 | (7) | (E2) | 0,0506 | (15) | 11,80 | (35) | 2,63 | (8) | 0,0657 (20) |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Energy P*γ*+ce Multipolarity *αK αL αM αT*  keV *×* 100 (10*−*3) (10*−*3) | | | | | | | | | | | |
| *γ*13*,*10(Sm) | 295,9390 | (17) | 0,449 (3) | E1 | 0,01310 | (39) | 1,78 | (5) | 0,381 | (11) | 0,01530 (46) |
| *γ*4*,*2(Gd) | 315,174 | (17) | 0,052 (2) | (E2) | 0,0400 | (12) | 9,38 | (28) | 2,12 | (6) | 0,0521 (16) |
| *γ*7*,*4(Sm) | 316,2 | (2) | 0,0032 (10) | (E2) | 0,0376 | (11) | 8,19 | (25) | 1,83 | (5) | 0,0481 (14) |
| *γ*(*−*1*,*1)(Sm) | 320,03 | (15) | 0,0017 (6) |  |  |  |  |  |  |  |  |
| *γ*11*,*6(Gd) | 324,83 | (3) | 0,0785 (16) | M1+50%E2 | 0,0521 | (16) | 8,97 | (27) | 1,99 | (6) | 0,0636 (19) |
| *γ*11*,*6(Sm) | 329,425 | (21) | 0,131 (6) | (E1) | 0,0100 | (3) | 1,360 | (41) | 0,290 | (9) | 0,01170 (35) |
| *γ*12*,*8(Sm) | 330,54 | (10) | 0,0061 (17) | (E1) | 0,0099 | (3) | 1,34 | (4) | 0,288 | (9) | 0,01160 (35) |
| *γ*4*,*2(Sm) | 340,40 | (14) | 0,033 (3) | E2 | 0,0304 | (9) | 6,32 | (19) | 1,410 | (42) | 0,0385 (12) |
| *γ*1*,*0(Gd) | 344,2789 | (12) | 27,65 (13) | E2 | 0,0311 | (9) | 6,87 | (21) | 1,550 | (46) | 0,0399 (12) |
| *γ*8*,*4(Gd) | 351,66 | (4) | 0,0145 (24) | E2 | 0,0293 | (9) | 6,39 | (19) | 1,440 | (43) | 0,0375 (11) |
| *γ*16*,*11(Sm) | 357,26 | (5) | 0,0041 (5) | (E1) | 0,00820 | (25) | 1,110 | (33) | 0,237 | (7) | 0,00960 (29) |
| *γ*7*,*3(Gd) | 367,7896 | (20) | 0,870 (5) | E1 | 0,00830 | (25) | 1,130 | (34) | 0,245 | (7) | 0,00970 (29) |
| *γ*(*−*1*,*2)(Sm) | 379,37 | (6) | 0,00083 (21) |  |  |  |  |  |  |  |  |
| *γ*18*,*12(Sm) | 385,69 | (20) | 0,0052 (7) | (M1+50%E2) | 0,0290 | (9) | 4,59 | (14) | 0,999 | (30) | 0,0348 (10) |
| *γ*10*,*4(Gd) | 387,90 | (8) | 0,00429 (45) | (M1+E2+E0) | 0,38 | (9) |  |  |  |  | 0,45 (11) |
| *γ*(*−*1*,*3)(Sm) | 391,32 | (14) | 0,00125 (22) |  |  |  |  |  |  |  |  |
| *γ*(*−*1*,*4)(Sm) | 406,74 | (15) | 0,00083 (21) |  |  |  |  |  |  |  |  |
| *γ*3*,*1(Gd) | 411,1171 | (12) | 2,292 (11) | E2 | 0,0190 | (6) | 3,79 | (11) | 0,849 | (25) | 0,0239 (7) |
| *γ*16*,*10(Sm) | 416,049 | (8) | 0,1097 (17) | (E1) | 0,00570 | (17) | 0,762 | (23) | 0,1630 | (49) | 0,0067 (2) |
| *γ*10*,*5(Sm) | 423,45 | (4) | 0,0033 (5) | (M1+50%E2) | 0,0226 | (7) | 3,5 | (1) | 0,761 | (23) | 0,0271 (8) |
| *γ*12*,*6(Gd) | 440,86 | (10) | 0,0136 (11) | (E2) | 0,01580 | (47) | 3,03 | (9) | 0,677 | (20) | 0,0197 (6) |
| *γ*5*,*2(Sm) | 443,966 | (3) | 0,325 (18) | (E2) | 0,01450 | (44) | 2,63 | (8) | 0,579 | (17) | 0,0178 (5) |
| *γ*13*,*9(Sm) | 443,966 | (3) | 2,821 (22) | E1(+M2) | 0,00520 | (16) | 0,635 | (19) | 0,1390 | (42) | 0,00600 (18) |
| *γ*13*,*7(Gd) | 482,31 | (3) | 0,0014 (6) | (E1) | 0,00440 | (13) | 0,594 | (18) | 0,1280 | (38) | 0,00510 (15) |
| *γ*11*,*5(Sm) | 482,31 | (3) | 0,0285 (16) | (M1+50%E2) | 0,01610 | (48) | 2,43 | (7) | 0,526 | (16) | 0,0192 (6) |
| *γ*13*,*8(Sm) | 488,680 | (2) | 0,4197 (24) | M1+E2 | 0,01150 | (34) | 1,96 | (6) | 0,429 | (13) | 0,01400 (42) |
| *γ*14*,*9(Sm) | 493,508 | (20) | 0,028 (3) | (E1) | 0,00380 | (11) | 0,509 | (15) | 0,1090 | (33) | 0,00450 (14) |
| *γ*6*,*2(Gd) | 493,509 | (20) | 0,0093 (21) | (E2) | 0,01180 | (35) | 2,14 | (6) | 0,476 | (14) | 0,01450 (44) |
| *γ*13*,*6(Gd) | 496,39 | (3) | 0,00461 (44) | M1+E2+E0 | 0,082 | (9) |  |  |  |  | 0,097 (11) |
| *γ*17*,*10(Sm) | 496,39 | (3) | 0,0049 (8) | (E1) | 0,00380 | (11) | 0,502 | (15) | 0,1070 | (32) | 0,00440 (13) |
| *γ*11*,*4(Gd) | 503,475 | (5) | 0,1554 (18) | (E2) | 0,01120 | (34) | 2,02 | (6) | 0,448 | (13) | 0,01380 (41) |
| *γ*14*,*7(Gd) | 520,228 | (5) | 0,0545 (12) | (M1+50%E2) | 0,01520 | (46) | 2,30 | (7) | 0,504 | (15) | 0,0181 (5) |
| *γ*18*,*10(Sm) | 523,13 | (5) | 0,0114 (21) | (M1+50%E2) | 0,01310 | (39) | 1,94 | (6) | 0,421 | (13) | 0,01560 (47) |
| *γ*8*,*3(Gd) | 526,882 | (20) | 0,0141 (7) | M1+E2+E0 | 0,084 | (9) |  |  |  |  | 0,094 (8) |
| *γ*14*,*6(Gd) | 534,246 | (7) | 0,0369 (19) | (E1) | 0,0035 | (1) | 0,470 | (14) | 0,101 | (3) | 0,00410 (12) |
| *γ*(*−*1*,*5)(Sm) | 535,4 | (4) | 0,0060 (16) | (M1+50%E2) | 0,01240 | (37) | 1,83 | (5) | 0,395 | (12) | 0,01470 (44) |
| *γ*14*,*8(Sm) | 538,29 | (6) | 0,0042 (6) | (M1+50%E2) | 0,01220 | (37) | 1,80 | (5) | 0,389 | (12) | 0,01450 (44) |
| *γ*14*,*7(Sm) | 556,56 | (3) | 0,0178 (11) | (E1) | 0,00290 | (9) | 0,387 | (12) | 0,0826 | (25) | 0,0034 (1) |
| *γ*13*,*5(Gd) | 557,91 | (17) | 0,0044 (7) | (E2) | 0,00870 | (26) | 1,490 | (45) | 0,331 | (10) | 0,01060 (32) |
| *γ*12*,*5(Sm) | 561,2 | (5) | 0,00109 (21) | (E2) | 0,00790 | (24) | 1,300 | (39) | 0,285 | (9) | 0,00960 (29) |
| *γ*3*,*1(Sm) | 562,93 | (2) | 0,038 (13) | E2 | 0,00780 | (23) | 1,290 | (39) | 0,282 | (8) | 0,00950 (28) |
| *γ*16*,*9(Sm) | 563,991 | (7) | 0,458 (14) | E1 | 0,00280 | (8) | 0,376 | (11) | 0,0802 | (24) | 0,0033 (1) |
| *γ*13*,*6(Sm) | 566,442 | (5) | 0,133 (4) | M1+35,4%E2 | 0,01170 | (35) | 1,66 | (5) | 0,357 | (11) | 0,01380 (41) |
| *γ*15*,*8(Sm) | 571,83 | (8) | 0,0048 (8) |  |  |  |  |  |  |  |  |
| *γ*4*,*1(Gd) | 586,266 | (3) | 0,4732 (41) | E2+4%M1+E0 | 0,0202 | (16) |  |  |  |  | 0,0243 (9) |
| *γ*(*−*1*,*6)(Sm) | 595,61 | (1) | 0,0031 (17) |  |  |  |  |  |  |  |  |
| *γ*14*,*6(Sm) | 616,05 | (3) | 0,0092 (6) | (E2) | 0,00630 | (19) | 1,00 | (3) | 0,219 | (7) | 0,00760 (23) |
| *γ*17*,*9(Sm) | 644,37 | (5) | 0,0063 (6) | (E1) | 0,00210 | (6) | 0,280 | (8) | 0,0598 | (18) | 0,00250 (8) |
| *γ*7*,*2(Sm) | 656,490 | (5) | 0,1519 (19) | E2+18%M1+E0 | 0,0497 | (16) |  |  |  |  | 0,0568 (20) |
| *γ*12*,*4(Sm) | 664,78 | (5) | 0,010 (3) | (E2) | 0,00520 | (16) | 0,818 | (25) | 0,178 | (5) | 0,00630 (19) |
| *γ*18*,*9(Sm) | 671,157 | (17) | 0,0196 (13) | M1+1,9%E2 | 0,00900 | (27) | 1,220 | (37) | 0,260 | (8) | 0,01050 (32) |
| *γ*13*,*4(Gd) | 674,677 | (7) | 0,0172 (18) | E2+17%M1 | 0,00630 | (19) | 0,980 | (29) | 0,215 | (6) | 0,00760 (23) |
| *γ*8*,*2(Sm) | 674,677 | (3) | 0,170 (4) | E1 | 0,00190 | (6) | 0,254 | (8) | 0,0542 | (16) | 0,00230 (7) |
| *γ*11*,*3(Gd) | 678,625 | (5) | 0,473 (4) | E2+6%M1 | 0,00570 | (17) | 0,900 | (27) | 0,198 | (6) | 0,00690 (21) |
| *γ*(*−*1*,*7)(Sm) | 683,32 | (11) | 0,0031 (8) |  |  |  |  |  |  |  |  |
| *γ*16*,*6(Sm) | 686,61 | (5) | 0,0201 (17) | (M1+50%E2) | 0,0067 | (2) | 0,954 | (29) | 0,205 | (6) | 0,00790 (24) |
| *γ*5*,*1(Sm) | 688,672 | (5) | 0,877 (6) | E2+M1+E0 | 0,0359 | (13) |  |  |  |  | 0,0434 (13) |
| *γ*(*−*1*,*8)(Sm) | 696,87 | (19) | 0,0029 (10) |  |  |  |  |  |  |  |  |
| *γ*5*,*1(Gd) | 703,25 | (6) | 0,0018 (9) | (E2) | 0,00500 | (15) | 0,796 | (24) | 0,175 | (5) | 0,00600 (18) |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Energy P*γ*+ce Multipolarity *αK αL αM αT*  keV *×* 100 (10*−*3) (10*−*3) | | | | | | | | | | | | |
| *γ*10*,*2(Gd) | 703,25 | (6) | 0,0035 (9) | (E2) | 0,00500 | (15) | 0,796 | (24) | 0,175 | (5) | 0,00600 | (18) |
| *γ*14*,*4(Gd) | 712,845 | (6) | 0,0963 (19) | (E1) | 0,00190 | (6) | 0,251 | (8) | 0,0541 | (16) | 0,00220 | (7) |
| *γ*13*,*5(Sm) | 719,351 | (4) | 0,059 (7) | (E1) | 0,00170 | (5) | 0,222 | (7) | 0,0473 | (14) | 0,00200 | (6) |
| *γ*9*,*2(Sm) | 719,351 | (4) | 0,270 (13) | (E2) | 0,00440 | (13) | 0,666 | (20) | 0,1440 | (43) | 0,00520 | (16) |
| *γ*19*,*8(Sm) | 727,99 | (14) | 0,0106 (13) | (E1) | 0,00166 | (5) | 0,216 | (6) | 0,0461 | (14) | 0,00193 | (6) |
| *γ*(*−*1*,*9)(Sm) | 735,4 | (1) | 0,0058 (10) |  |  |  |  |  |  |  |  |  |
| *γ*(*−*1*,*10)(Sm) | 756,12 | (9) | 0,0054 (8) |  |  |  |  |  |  |  |  |  |
| *γ*6*,*1(Gd) | 764,902 | (9) | 0,191 (4) | E2+6,5%M1 | 0,00440 | (13) | 0,669 | (20) | 0,1460 | (44) | 0,00520 | (16) |
| *γ*14*,*5(Sm) | 768,946 | (9) | 0,089 (3) | (E1) | 0,001500 | (45) | 0,193 | (6) | 0,0412 | (12) | 0,00170 | (5) |
| *γ*7*,*1(Gd) | 778,9066 | (24) | 12,99 (6) | E1 | 0,001600 | (48) | 0,209 | (6) | 0,0450 | (14) | 0,00190 | (6) |
| *γ*12*,*3(Gd) | 794,81 | (3) | 0,0265 (11) | M1(+13,8%E2) | 0,0065 | (2) | 0,905 | (27) | 0,196 | (6) | 0,00770 | (23) |
| *γ*19*,*6(Sm) | 805,70 | (7) | 0,0125 (8) | (E1) | 0,001400 | (42) | 0,176 | (5) | 0,0374 | (11) | 0,001600 | (48) |
| *γ*5*,*0(Sm) | 810,453 | (5) | 0,318 (3) | (E2) | 0,0033 | (1) | 0,493 | (15) | 0,1070 | (32) | 0,00400 | (12) |
| *γ*16*,*5(Sm) | 839,36 | (4) | 0,0161 (8) | (E1) | 0,001200 | (36) | 0,1620 | (49) | 0,0345 | (10) | 0,001500 | (45) |
| *γ*6*,*1(Sm) | 841,576 | (5) | 0,163 (2) | E1 | 0,001200 | (36) | 0,1610 | (48) | 0,0343 | (10) | 0,001500 | (45) |
| *γ*10*,*2(Sm) | 867,383 | (3) | 4,258 (23) | E2+2%M1 | 0,00290 | (9) | 0,423 | (13) | 0,0913 | (27) | 0,0035 | (1) |
| *γ*(*−*1*,*11)(Sm) | 896,58 | (9) | 0,0669 (21) |  |  |  |  |  |  |  |  |  |
| *γ*7*,*1(Sm) | 901,184 | (11) | 0,084 (3) | E2 | 0,00260 | (8) | 0,382 | (11) | 0,0824 | (25) | 0,00310 | (9) |
| *γ*15*,*4(Sm) | 906,01 | (6) | 0,016 (1) |  |  |  |  |  |  |  |  |  |
| *γ*8*,*1(Sm) | 919,340 | (4) | 0,430 (4) | E1 | 0,00100 | (3) | 0,135 | (4) | 0,0288 | (9) | 0,001200 | (36) |
| *γ*11*,*2(Sm) | 926,320 | (15) | 0,274 (4) | (E2) | 0,00250 | (8) | 0,358 | (11) | 0,0772 | (23) | 0,00290 | (9) |
| *γ*4*,*0(Gd) | 930,58 | (15) | 0,0731 (19) | (E2) | 0,00270 | (8) | 0,400 | (12) | 0,0872 | (26) | 0,0032 | (1) |
| *γ*15*,*3(Gd) | 937,053 | (15) | 0,0027 (6) | (M1+50%E2) | 0,00370 | (11) | 0,516 | (15) | 0,1120 | (34) | 0,00430 | (13) |
| *γ*19*,*5(Sm) | 958,63 | (5) | 0,0211 (19) | (M1+E2) | 0,00310 | (9) |  |  |  |  | 0,00360 | (11) |
| *γ*6*,*0(Sm) | 963,393 | (12) | 0,1342 (20) | E1 | 0,00100 | (3) | 0,1230 | (37) | 0,0263 | (8) | 0,001100 | (33) |
| *γ*9*,*1(Sm) | 964,082 | (18) | 14,54 (7) | E2(+M1) | 0,00230 | (7) | 0,327 | (10) | 0,0703 | (21) | 0,00270 | (8) |
| *γ*10*,*1(Gd) | 974,09 | (4) | 0,0139 (8) | M1+50%E2+E0 | 0,0048 | (5) |  |  |  |  | 0,0056 | (6) |
| *γ*13*,*2(Gd) | 990,19 | (3) | 0,0315 (13) | (E2) | 0,00240 | (7) | 0,347 | (10) | 0,0755 | (23) | 0,00300 | (9) |
| *γ*(*−*1*,*12)(Sm) | 1001,1 | (3) | 0,0046 (10) |  |  |  |  |  |  |  |  |  |
| *γ*12*,*2(Sm) | 1005,276 | (17) | 0,667 (23) |  | 0,00220 | (7) | 0,311 | (9) | 0,0669 | (20) | 0,00260 | (8) |
| *γ*(*−*1*,*15)(Sm) | 1084 | (1) | 0,244 (8) |  |  |  |  |  |  |  |  |  |
| *γ*9*,*0(Sm) | 1085,841 | (10) | 10,15 (6) | E2 | 0,00180 | (5) | 0,250 | (8) | 0,0536 | (16) | 0,00210 | (6) |
| *γ*11*,*1(Gd) | 1089,741 | (5) | 1,735 (10) | (M1)+E2 | 0,00200 | (6) |  |  |  |  | 0,00230 | (7) |
| *γ*6*,*0(Gd) | 1109,178 | (12) | 0,186 (4) | E2 | 0,00190 | (6) | 0,269 | (8) | 0,0584 | (18) | 0,00220 | (7) |
| *γ*10*,*1(Sm) | 1112,080 | (3) | 13,44 (6) | E2(+1%M1) | 0,00170 | (5) | 0,238 | (7) | 0,0511 | (15) | 0,00200 | (6) |
| *γ*(*−*1*,*13)(Sm) | 1139 | (1) | 0,0013 (3) |  |  |  |  |  |  |  |  |  |
| *γ*11*,*1(Sm) | 1170,93 | (11) | 0,0366 (13) | (M1+50%E2) | 0,00200 | (6) | 0,265 | (8) | 0,0567 | (17) | 0,00230 | (7) |
| *γ*12*,*1(Gd) | 1206,11 | (15) | 0,0138 (8) | (E2) | 0,001600 | (48) | 0,225 | (7) | 0,0487 | (15) | 0,00190 | (6) |
| *γ*14*,*2(Sm) | 1212,953 | (11) | 1,417 (9) | E1 | 0,000600 | (18) | 0,0802 | (24) | 0,0170 | (5) | 0,000700 | (21) |
| *γ*12*,*1(Sm) | 1249,944 | (13) | 0,187 (3) | E2 | 0,001400 | (42) | 0,184 | (6) | 0,0395 | (12) | 0,001600 | (48) |
| *γ*13*,*1(Gd) | 1261,349 | (23) | 0,0337 (11) | M1 | 0,00230 | (7) | 0,313 | (9) | 0,0676 | (20) | 0,00270 | (8) |
| *γ*11*,*0(Sm) | 1292,784 | (19) | 0,104 (3) | (E2) | 0,001300 | (39) | 0,172 | (5) | 0,0368 | (11) | 0,001500 | (45) |
| *γ*14*,*1(Gd) | 1299,148 | (8) | 1,634 (9) | E1(+0,2%M2) | 0,000600 | (18) | 0,0803 | (24) | 0,0172 | (5) | 0,000700 | (21) |
| *γ*9*,*0(Gd) | 1314,7 | (2) | 0,0048 (6) | E1 | 0,000600 | (18) | 0,0773 | (23) | 0,0166 | (5) | 0,000700 | (21) |
| *γ*15*,*1(Gd) | 1348,10 | (7) | 0,0175 (8) | E2+(0,6%M1) | 0,001300 | (39) | 0,179 | (5) | 0,0387 | (12) | 0,001600 | (48) |
| *γ*17*,*2(Sm) | 1363,77 | (5) | 0,0257 (8) | M1(+E2) | 0,00170 | (5) | 0,222 | (7) | 0,0474 | (14) | 0,00200 | (6) |
| *γ*18*,*2(Sm) | 1390,36 | (16) | 0,0048 (6) | (M1+50%E2) | 0,001400 | (42) | 0,180 | (5) | 0,0385 | (12) | 0,001600 | (48) |
| *γ*13*,*1(Sm) | 1408,013 | (3) | 20,86 (9) | E1(+M2) | 0,000500 | (15) | 0,0615 | (18) | 0,01310 | (39) | 0,000600 | (18) |
| *γ*14*,*1(Sm) | 1457,651 | (11) | 0,498 (4) | E1 | 0,000500 | (15) | 0,0580 | (17) | 0,01230 | (37) | 0,000500 | (15) |
| *γ*16*,*1(Sm) | 1528,111 | (18) | 0,281 (5) | E1 | 0,000400 | (12) |  |  |  |  | 0,000500 | (15) |
| *γ*13*,*0(Gd) | 1605,61 | (7) | 0,0081 (4) | (E2) | 0,000900 | (27) |  |  |  |  | 0,000900 | (27) |
| *γ*17*,*1(Sm) | 1608,36 | (8) | 0,0053 (3) | (E1) | 0,000400 | (12) |  |  |  |  | 0,000400 | (12) |
| *γ*18*,*1(Sm) | 1635,2 | (5) | 0,00015 (5) | (M1+50%E2) | 0,00100 | (3) |  |  |  |  | 0,00100 | (3) |
| *γ*14*,*0(Gd) | 1643,6 | (1) | 0,0015 (4) | (M2) | 0,00280 | (8) |  |  |  |  | 0,0032 | (1) |
| *γ*19*,*1(Sm) | 1647,41 | (14) | 0,0064 (4) | (E2) | 0,000800 | (24) |  |  |  |  | 0,000800 | (24) |
| *γ*(*−*1*,*14)(Sm) | 1674,30 | (6) | 0,0060 (8) |  |  |  |  |  |  |  |  |  |
| *γ*19*,*0(Sm) | 1769,09 | (5) | 0,0092 (3) | (E2) | 0,000700 | (21) |  |  |  |  | 0,000700 | (21) |

1. **Atomic Data**

# Sm

*ωK* : 0,926 (4)

## *ω*¯*L* : 0,158 (6)

*nKL* : 0,857 (4)

* + 1. **X Radiations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Energy Relative  keV probability | | | | |
| XK | K*α*2 | 39,5229 | *}*  *}*  *}*  *}*  *}*  *}* | 55,25 |
|  | K*α*1 | 40,1186 | 100 |
|  | K*β*3 | 45,289 |  |
|  | K*β*1 K*βjj*  5 | 45,413  45,731 | 31,23 |
|  | K*β*2 | 46,575 |  |
|  | K*β*4 | 46,705 | 8,06 |
|  | KO2*,*3 | 46,813 |  |
| XL | L*α* | 5,61 – 5,64 |  |
|  | L*γ* | – 7,18 |  |

* + 1. **Auger Electrons**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Energy Relative  keV probability | | | | |
| Auger K |  |  |  |  |
| KLL | 31,190 | – | 33,218 | 100 |
| KLX | 37,302 | – | 40,097 | 50,7 |
| KXY | 43,39 | – | 46,79 | 6,42 |
| Auger L | 0,08 | – | 7,69 | 1815 |

# Gd

*ωK* : 0,932 (4)

## *ω*¯*L* : 0,176 (6)

*nKL* : 0,850 (4)

* + 1. **X Radiations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Energy Relative  keV probability | | | | |
| XK | K*α*2 | 42,3093 | *}*  *}*  *}*  *}*  *}*  *}* | 55,59 |
|  | K*α*1 | 42,9967 | 100 |
|  | K*β*3 | 48,556 |  |
|  | K*β*1 K*βjj*  5 | 48,697  49,053 | 31,6 |
|  | K*β*2 | 49,961 |  |
|  | K*β*4 | 50,099 | 8,31 |
|  | KO2*,*3 | 50,219 |  |
| XL | L*α* | 6,025 – 6,057 |  |
|  | L*γ* | – 7,78 |  |

* + 1. **Auger Electrons**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Energy Relative  keV probability | | | | |
| Auger K |  |  |  |  |
| KLL | 33,310 | – | 35,562 | 100 |
| KLX | 39,907 | – | 42,976 | 51,3 |
| KXY | 46,48 | – | 50,20 | 6,58 |
| Auger L | 0,07 | – | 8,33 |  |

# Electron Emissions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Energy Electrons keV per 100 disint. | | | | | | |
| eAL eAK  eAL eAK  ec1*,*0 ec1*,*0 ec1*,*0 ec1*,*0 ec2*,*1 ec2*,*1 ec1*,*0 ec1*,*0  *β*+  0*,*1  *β*+  0*,*1  *β*+  0*,*2  *β*+  0*,*2  *β*0*−,*15 *β*0*−,*15 *β*0*−,*14 *β*0*−,*14 *β*0*−,*13 *β*0*−,*13 *β*0*−,*12 *β*0*−,*12 *β*0*−,*11 *β*0*−,*11 *β*0*−,*10 *β*0*−,*10 *β*0*−,*9 *β*0*−,*9 *β*0*−,*8 *β*0*−,*8 |  | (Sm) | 0,08 - 7,69 |  | 67,7 | (7) |
|  | (Sm) |  |  | 5,9 | (4) |
|  | KLL KLX KXY | 31,190 - 33,218  37,302 - 40,097  43,39 - 46,79 | *}*  *}*  *}* |  |  |
|  | (Gd) | 0,07 - 8,33 |  | 0,800 | (14) |
|  | (Gd) |  |  | 0,062 | (4) |
|  | KLL KLX KXY | 33,310 - 35,562  39,907 - 42,976  46,48 - 50,20 | *}*  *}*  *}* |  |  |
| K | (Sm) | 74,9475 (20) |  | 19,2 | (6) |
| L | (Sm) | 114,045 - 115,066 |  | 10,7 | (3) |
| M | (Sm) | 120,059 - 120,702 |  | 2,48 | (7) |
| N | (Sm) | 121,436 - 121,776 |  | 0,57 | (2) |
| K | (Sm) | 197,8632 (20) |  | 0,611 | (19) |
| L | (Sm) | 236,961 - 237,981 |  | 0,159 | (5) |
| K | (Gd) | 294,0394 (20) |  | 0,86 | (3) |
| L | (Gd) | 335,903 - 337,036 |  | 0,190 | (6) |
|  | max: | 730,5 (7) |  | 0,025 | (15) |
|  | avg: | 338,1 (3) |  |  |  |
|  | max: | 485,8 (7) |  | 0,0024 | (2) |
|  | avg: | 230,7 (3) |  |  |  |
|  | max: | 126,4 (11) |  | 0,0203 | (11) |
|  | avg: | 33,4 (3) |  |  |  |
|  | max: | 175,4 (11) |  | 1,826 | (21) |
|  | avg: | 47,4 (4) |  |  |  |
|  | max: | 213,5 (11) |  | 0,101 | (3) |
|  | avg: | 58,6 (4) |  |  |  |
|  | max: | 268,6 (11) |  | 0,0536 | (18) |
|  | avg: | 75,2 (4) |  |  |  |
|  | max: | 384,8 (11) |  | 2,44 | (3) |
|  | avg: | 112,3 (4) |  |  |  |
|  | max: | 500,3 (11) |  | 0,0267 | (17) |
|  | avg: | 151,4 (4) |  |  |  |
|  | max: | 504,1 (11) |  | 0,0048 | (7) |
|  | avg: | 152,7 (4) |  |  |  |
|  | max: | 536,5 (11) |  | 0,037 | (8) |
|  | avg: | 164,1 (4) |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Energy Electrons keV per 100 disint. | | | | | |
| *β*0*−,*7 | max: | 695,6 | (11) | 13,80 | (15) |
| *β*0*−,*7 | avg: | 221,7 | (4) |  |  |
| *β*0*−,*6 | max: | 709,7 | (11) | 0,245 | (8) |
| *β*0*−,*6 | avg: | 226,9 | (5) |  |  |
| *β*0*−,*4 | max: | 888,2 | (11) | 0,303 | (7) |
| *β*0*−,*4 | avg: | 295,1 | (5) |  |  |
| *β*0*−,*3 | max: | 1063,4 | (11) | 0,904 | (14) |
| *β*0*−,*3 | avg: | 364,6 | (5) |  |  |
| *β*0*−,*1 | max: | 1474,5 | (11) | 8,17 | (11) |
| *β*0*−,*1 | avg: | 535,4 | (5) |  |  |

1. **Photon Emissions**

# X-Ray Emissions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Energy Photons keV per 100 disint. | | | | | | |
| XL  XK*α*2 XK*α*1  XK*β*3 XK*β*1  XK*βjj*  5  XK*β*2  XK*β*4 XKO2*,*3  XL  XK*α*2 XK*α*1  XK*β*3 XK*β*1  XK*βjj*  5  XK*β*2  XK*β*4 XKO2*,*3 | (Sm) | 5,61 — 7,18 | *}*  *}*  *}*  *}*  *}*  *}*  *}*  *}*  *}*  *}*  *}*  *}* | 13,0 | (4) | *}* K*α*  *}*  K*j β*1  K*j β*2  *}* K*α*  *}*  K*j β*1  K*j β*2 |
| (Sm) | 39,5229 | 20,8 | (3) |
| (Sm) | 40,1186 | 37,7 | (5) |
| (Sm) | 45,289 |  |  |
| (Sm) | 45,413 | 11,78 | (19) |
| (Sm) | 45,731 |  |  |
| (Sm) | 46,575 |  |  |
| (Sm) | 46,705 | 3,04 | (8) |
| (Sm) | 46,813 |  |  |
| (Gd) | 6,025 — 7,78 | 0,177 | (5) |
| (Gd) | 42,3093 | 0,243 | (7) |
| (Gd) | 42,9967 | 0,437 | (12) |
| (Gd) | 48,556 |  |  |
| (Gd) | 48,697 | 0,138 | (4) |
| (Gd) | 49,053 |  |  |
| (Gd) | 49,961 |  |  |
| (Gd) | 50,099 | 0,0363 | (13) |
| (Gd) | 50,219 |  |  |

* 1. **Gamma Emissions**

|  |  |  |  |
| --- | --- | --- | --- |
| Energy Photons keV per 100 disint. | | | |
| *γ*1*,*0(Sm) | 121,7817 | (3) | 28,41 (13) |
| *γ*5*,*3(Sm) | 125,69 | (13) | 0,019 (6) |
| *γ*10*,*9(Sm) | 148,010 | (17) | 0,035 (5) |
| *γ*7*,*4(Gd) | 192,6 | (4) | 0,0068 (2) |
| *γ*14*,*12(Sm) | 207,6 | (3) | 0,0059 (4) |
| *γ*14*,*11(Gd) | 209,41 | (13) | 0,0055 (5) |
| *γ*7*,*5(Sm) | 212,568 | (15) | 0,0196 (6) |
| *γ*(*−*1*,*0)(Sm) | 237,31 | (5) | 0,0025 (8) |
| *γ*19*,*13(Sm) | 239,42 | (17) | 0,008 (3) |
| *γ*2*,*1(Sm) | 244,6974 | (8) | 7,55 (4) |
| *γ*11*,*8(Sm) | 251,633 | (10) | 0,0671 (15) |
| *γ*11*,*7(Sm) | 269,86 | (6) | 0,0060 (24) |
| *γ*2*,*1(Gd) | 271,131 | (8) | 0,078 (3) |
| *γ*9*,*5(Sm) | 275,449 | (15) | 0,0323 (17) |
| *γ*12*,*9(Sm) | 285,98 | (3) | 0,0100 (6) |
| *γ*13*,*10(Sm) | 295,9387 | (17) | 0,442 (3) |
| *γ*4*,*2(Gd) | 315,174 | (17) | 0,0496 (17) |
| *γ*7*,*4(Sm) | 316,2 | (2) | 0,0031 (10) |
| *γ*(*−*1*,*1)(Sm) | 320,03 | (15) | 0,0017 (6) |
| *γ*11*,*6(Gd) | 324,83 | (3) | 0,0738 (15) |
| *γ*11*,*6(Sm) | 329,425 | (21) | 0,129 (6) |
| *γ*12*,*8(Sm) | 330,54 | (10) | 0,0060 (17) |
| *γ*4*,*2(Sm) | 340,40 | (14) | 0,031 (3) |
| *γ*1*,*0(Gd) | 344,2785 | (12) | 26,59 (12) |
| *γ*8*,*4(Gd) | 351,66 | (4) | 0,0140 (22) |
| *γ*16*,*11(Sm) | 357,26 | (5) | 0,0040 (5) |
| *γ*7*,*3(Gd) | 367,7891 | (20) | 0,862 (5) |
| *γ*(*−*1*,*2)(Sm) | 379,37 | (6) | 0,00083 (21) |
| *γ*18*,*12(Sm) | 385,69 | (20) | 0,0050 (6) |
| *γ*10*,*4(Gd) | 387,90 | (8) | 0,00296 (21) |
| *γ*(*−*1*,*3)(Sm) | 391,32 | (14) | 0,00125 (21) |
| *γ*(*−*1*,*4)(Sm) | 406,74 | (15) | 0,00083 (21) |
| *γ*3*,*1(Gd) | 411,1165 | (12) | 2,238 (10) |
| *γ*16*,*10(Sm) | 416,048 | (8) | 0,1090 (17) |
| *γ*10*,*5(Sm) | 423,45 | (4) | 0,0032 (5) |
| *γ*12*,*6(Gd) | 440,86 | (10) | 0,0133 (10) |
| *γ*5*,*2(Sm) | 443,965 | (3) | 0,32 (2) |
| *γ*13*,*9(Sm) | 443,965 | (3) | 2,80 (2) |
| *γ*13*,*7(Gd) | 482,31 | (3) | 0,00139 (6) |
| *γ*11*,*5(Sm) | 482,31 | (3) | 0,0279 (16) |
| *γ*13*,*8(Sm) | 488,6792 | (20) | 0,4139 (24) |
| *γ*6*,*2(Gd) | 493,508 | (20) | 0,009 (2) |
| *γ*14*,*9(Sm) | 493,508 | (20) | 0,0278 (30) |
| *γ*13*,*6(Gd) | 496,39 | (3) | 0,0042 (4) |
| *γ*17*,*10(Sm) | 496,39 | (3) | 0,0049 (5) |

|  |  |  |  |
| --- | --- | --- | --- |
| Energy Photons keV per 100 disint. | | | |
| *γ*11*,*4(Gd) | 503,474 | (5) | 0,1533 (18) |
| *γ±* | 511 |  | 0,054 (30) |
| *γ*14*,*7(Gd) | 520,227 | (5) | 0,0536 (13) |
| *γ*18*,*10(Sm) | 523,13 | (5) | 0,0113 (21) |
| *γ*8*,*3(Gd) | 526,881 | (20) | 0,0129 (6) |
| *γ*14*,*6(Gd) | 534,245 | (7) | 0,0368 (19) |
| *γ*(*−*1*,*5)(Sm) | 535,4 | (4) | 0,0060 (16) |
| *γ*14*,*8(Sm) | 538,29 | (6) | 0,0042 (6) |
| *γ*14*,*7(Sm) | 556,56 | (3) | 0,0177 (11) |
| *γ*13*,*5(Gd) | 557,91 | (17) | 0,0044 (7) |
| *γ*12*,*5(Sm) | 561,2 | (5) | 0,00108 (21) |
| *γ*3*,*1(Sm) | 562,93 | (2) | 0,038 (13) |
| *γ*16*,*9(Sm) | 563,990 | (7) | 0,457 (13) |
| *γ*13*,*6(Sm) | 566,442 | (5) | 0,131 (4) |
| *γ*15*,*8(Sm) | 571,83 | (8) | 0,0048 (8) |
| *γ*4*,*1(Gd) | 586,265 | (3) | 0,462 (4) |
| *γ*(*−*1*,*6)(Sm) | 595,61 | (1) | 0,0031 (17) |
| *γ*14*,*6(Sm) | 616,05 | (3) | 0,0092 (6) |
| *γ*17*,*9(Sm) | 644,37 | (5) | 0,0063 (6) |
| *γ*7*,*2(Sm) | 656,489 | (5) | 0,1437 (18) |
| *γ*12*,*4(Sm) | 664,78 | (5) | 0,010 (3) |
| *γ*18*,*9(Sm) | 671,155 | (17) | 0,0194 (13) |
| *γ*8*,*2(Sm) | 674,675 | (3) | 0,170 (4) |
| *γ*13*,*4(Gd) | 674,677 | (3) | 0,0171 (18) |
| *γ*11*,*3(Gd) | 678,623 | (5) | 0,470 (4) |
| *γ*(*−*1*,*7)(Sm) | 683,32 | (11) | 0,0031 (8) |
| *γ*16*,*6(Sm) | 686,61 | (5) | 0,0200 (17) |
| *γ*5*,*1(Sm) | 688,670 | (5) | 0,841 (6) |
| *γ*(*−*1*,*8)(Sm) | 696,87 | (19) | 0,0029 (10) |
| *γ*10*,*2(Gd) | 703,25 | (6) | 0,0035 (9) |
| *γ*5*,*1(Gd) | 703,25 | (6) | 0,0018 (9) |
| *γ*14*,*4(Gd) | 712,843 | (6) | 0,0961 (19) |
| *γ*13*,*5(Sm) | 719,349 | (4) | 0,059 (7) |
| *γ*9*,*2(Sm) | 719,349 | (4) | 0,268 (13) |
| *γ*19*,*8(Sm) | 727,99 | (14) | 0,0106 (13) |
| *γ*(*−*1*,*9)(Sm) | 735,4 | (1) | 0,0058 (10) |
| *γ*(*−*1*,*10)(Sm) | 756,12 | (9) | 0,0054 (8) |
| *γ*6*,*1(Gd) | 764,900 | (9) | 0,190 (4) |
| *γ*14*,*5(Sm) | 768,944 | (9) | 0,088 (3) |
| *γ*7*,*1(Gd) | 778,9045 | (24) | 12,97 (6) |
| *γ*12*,*3(Gd) | 794,81 | (3) | 0,0263 (10) |
| *γ*19*,*6(Sm) | 805,70 | (7) | 0,0125 (8) |
| *γ*5*,*0(Sm) | 810,451 | (5) | 0,317 (3) |
| *γ*16*,*5(Sm) | 839,36 | (4) | 0,0160 (8) |
| *γ*6*,*1(Sm) | 841,574 | (5) | 0,163 (2) |
| *γ*10*,*2(Sm) | 867,380 | (3) | 4,243 (23) |
| *γ*(*−*1*,*11)(Sm) | 896,58 | (9) | 0,0669 (21) |

|  |  |  |  |
| --- | --- | --- | --- |
| Energy Photons keV per 100 disint. | | | |
| *γ*7*,*1(Sm) | 901,181 | (11) | 0,084 (3) |
| *γ*15*,*4(Sm) | 906,01 | (6) | 0,016 (1) |
| *γ*8*,*1(Sm) | 919,337 | (4) | 0,429 (5) |
| *γ*11*,*2(Sm) | 926,317 | (15) | 0,273 (4) |
| *γ*4*,*0(Gd) | 930,58 | (15) | 0,0729 (19) |
| *γ*15*,*3(Gd) | 937,050 | (15) | 0,0027 (6) |
| *γ*19*,*5(Sm) | 958,63 | (5) | 0,0210 (19) |
| *γ*6*,*0(Sm) | 963,390 | (12) | 0,1341 (20) |
| *γ*9*,*1(Sm) | 964,079 | (18) | 14,50 (6) |
| *γ*10*,*1(Gd) | 974,09 | (4) | 0,0138 (8) |
| *γ*13*,*2(Gd) | 990,19 | (3) | 0,0315 (13) |
| *γ*(*−*1*,*12)(Sm) | 1001,1 | (3) | 0,0046 (10) |
| *γ*12*,*2(Sm) | 1005,272 | (17) | 0,665 (23) |
| *γ*(*−*1*,*15)(Sm) | 1084 | (1) | 0,244 (8) |
| *γ*9*,*0(Sm) | 1085,837 | (10) | 10,13 (6) |
| *γ*11*,*1(Gd) | 1089,737 | (5) | 1,73 (1) |
| *γ*6*,*0(Gd) | 1109,174 | (12) | 0,186 (4) |
| *γ*10*,*1(Sm) | 1112,076 | (3) | 13,41 (6) |
| *γ*(*−*1*,*13)(Sm) | 1139 | (1) | 0,0013 (3) |
| *γ*11*,*1(Sm) | 1170,93 | (11) | 0,0365 (13) |
| *γ*12*,*1(Gd) | 1206,11 | (15) | 0,0135 (8) |
| *γ*14*,*2(Sm) | 1212,948 | (11) | 1,416 (9) |
| *γ*12*,*1(Sm) | 1249,938 | (13) | 0,186 (3) |
| *γ*13*,*1(Gd) | 1261,343 | (23) | 0,0336 (11) |
| *γ*11*,*0(Sm) | 1292,778 | (19) | 0,104 (3) |
| *γ*14*,*1(Gd) | 1299,142 | (8) | 1,633 (9) |
| *γ*9*,*0(Gd) | 1314,7 | (2) | 0,0048 (6) |
| *γ*15*,*1(Gd) | 1348,10 | (7) | 0,0175 (8) |
| *γ*17*,*2(Sm) | 1363,77 | (5) | 0,0256 (8) |
| *γ*18*,*2(Sm) | 1390,36 | (16) | 0,0048 (6) |
| *γ*13*,*1(Sm) | 1408,013 | (3) | 20,85 (8) |
| *γ*14*,*1(Sm) | 1457,643 | (11) | 0,498 (4) |
| *γ*16*,*1(Sm) | 1528,103 | (18) | 0,281 (5) |
| *γ*13*,*0(Gd) | 1605,61 | (7) | 0,0081 (4) |
| *γ*17*,*1(Sm) | 1608,36 | (8) | 0,0053 (3) |
| *γ*18*,*1(Sm) | 1635,2 | (5) | 0,00015 (5) |
| *γ*14*,*0(Gd) | 1643,6 | (1) | 0,0015 (4) |
| *γ*19*,*1(Sm) | 1647,41 | (14) | 0,0064 (4) |
| *γ*(*−*1*,*14)(Sm) | 1674,30 | (6) | 0,0060 (8) |
| *γ*19*,*0(Sm) | 1769,09 | (5) | 0,0092 (3) |

# Main Production Modes

Eu *−* 151(n*,γ*)Eu *−* 152

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8 06 25 1

1

1

0 2

4 2

06 09

3 4 8 15

0,068

,0 ,0 ,0 ,0 ,0 ,0

5 1 9 4 0

0,041

0 0 0 0 0 0

0 1 1 0 0

9 3 6 3

2+ ; 1769,1

,0 ,0 ,0 ,0 ,0

4 6 5 5

0,0422

27 fs

1,4 ps

3 ps

0,87 ps

27 fs

7,4 ps

24,72

0,869

17,16

21,35

0,086

1,28

57,7 ps

1,400 ns

0,77

1,7

0,0024

0,025

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19 |  |  |  |  |  | 0 | | 0 | | 0 | | 0 | | 0 | |  | | ,00 , 0 ,02 ,00  0 | | | | 2,3+ ; 1757,151 |
| 18 |  |  |  |  |  |  |  | |  | |  | |  | |  | 0 | | 0 0 0 | | | | (3) - ; 1730,241 |
| 17 |  |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  |  | 2 - ; 1529,8073 | |
| 13 | |  |  |  |  |  |  | |  | |  | |  | |  | |  | |  |  | 4 + ; 1371,691 | |
| 12 | |  |  |  |  |  | | |  | |  | |  | |  | |  | |  |  | 3+ ; 1233,8656 | |
| 10 | |  |  |  |  |  | | | | |  | |  | |  | | | |  |  | 2+ ; 1085,8499 | |
| 9 | |  |  |  |  |  | | | | | | |  | |  | | | | |  | 3 - ; 1041,1342 | |
| 8 | | |  |  |  |  | | | | | | |  | |  | | | | |  | 1 - ; 963,36 | |
| 6 | | | |  |  |  | | | | | | |  | |  | | | | |  | 2 + ; 810,4474 | |
| 5 | | | | |  |  | | | | | | |  | |  | | | | |  | 4 + ; 366,4786 | |
| 2 | | | | |  |  | | | | | | | | |  | | | | | | 2 + ; 121,7818 | |
| 1 | | | | | | 0+ ; 0 | | | | | | | | | | | | | | | | |

04 09 7 2 16 81

5

0,889

,0 ,1 ,4 ,0 ,0 ,2 8

0 0 0

0 0 0 4 6

1

0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16 |  |  |  |  |  | 0,0 0,0 | | | 59 78 2 77 92 8 6  0 2 04 1 0 8 1 | | | | | | | | |  | 8 | 1612,94 |
| 15 |  |  |  |  |  |  |  |  | 0,0 0,0 0,0 0,0 0,0 0,0 1,4 0,4 | | | | | | | | |  |  | 3 - ; 1579,365 |
| 14 |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  | 4+ ; 1371,691 | | | |
| 12 |  |  |  |  |  |  |  |  | | |  |  |  |  |  |  | (2) + ; 1292,771 | | | |
| 11 | |  |  |  |  |  |  |  | | |  |  |  |  |  |  | 3+ ; 1233,8656 | | | |
| 10 | | |  |  |  |  |  |  | | |  |  |  |  |  |  | 2+ ; 1085,8499 | | | |
| 9 | | | |  |  |  |  |  | | | |  |  |  |  |  | 3 - ; 1041,1342 | | | |
| 8 | | | |  |  |  | |  | | | | |  |  |  |  | 4 - ; 1022,967 | | | |
| 7 | | | |  |  |  | |  | | | | | |  |  |  | 1 - ; 963,36 | | | |
| 6 | | | | |  |  | |  | | | | | | |  |  | 2+ ; 810,4474 | | | |
| 5 | | | | | |  | |  | | | | | | | |  | 6+ ; 706,91 | | | |
| 4 | | | | | |  | | | | | | | | | |  | 4+ ; 366,4786 | | | |
| 2 | | | | | |  | | | | | | | | | | | 2+ ; 121,7818 | | | |

2 - ; 1649,91

0,0208

2,068

1,4 ps

8 ps

3 ps

0,87 ps

27 fs

4,9 ps

7,4 ps

0,869

0,644

17,16

21,35

0,086

0,238

1,28

57,7 ps

0,77

0,0024

1,400 ns 1

1,7

0,025

0+ ; 0

9

2 3 1 9 5

24,72

4 1 3 5 ,8

,4 ,8 ,4 ,1 ,0 0

27 fs

0 2 0 0 0 2

2 - ; 1529,8073

1,4 ps

8 ps

3 ps

0,87 ps

27 fs

4,9 ps

7,4 ps

0,869

0,644

17,16

21,35

0,086

0,238

1,28

57,7 ps

1,400 ns

0,77

1,7

0,0024

0,025

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13 |  |  |  |  |  | 08  1 06 01 1 5  6  0,0 0,0 0,0 0,0 0,6 0,1 | | | | | | | 86 | | | | | | | |  | 4+ ; 1371,691 |
| 12 |  |  |  |  |  |  |  |  |  |  |  |  | 71 6 9 79 3 65  6 0 2 2 7 3 0  0,0 0,0 0,1 0,0 0,2 0,0 0,1 | | | | | | | | 4 | (2) + ; 1292,771 |
| 11 |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  | 3+ ; 1233,8656 | | |
| 10 | |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  | 2+ ; 1085,8499 | | |
| 9 | | |  |  |  |  | |  |  |  |  |  | |  |  |  |  |  |  | 3 - ; 1041,1342 | | |
| 8 | | | |  |  |  | | |  |  |  |  | | |  |  |  |  |  | 4 - ; 1022,967 | | |
| 7 | | | |  |  |  | | |  |  |  |  | | | |  |  |  |  | 1 - ; 963,36 | | |
| 6 | | | | |  |  | | |  |  |  |  | | | | |  |  |  | 2+ ; 810,4474 | | |
| 5 | | | | | |  | | | |  |  |  | | | | | |  |  | 6+ ; 706,91 | | |
| 4 | | | | | |  | | | | |  |  | | | | | |  |  | 4+ ; 366,4786 | | |
| 2 | | | | | |  | | | | | |  | | | | | | |  | 2+ ; 121,7818 | | |
| 1 | | | | | | | | | | | | | | | | | | | | 0+ ; 0 | | |

3 - ; 0 63 89

13,522 (16)

0

+

152

Eu



 Emission probabilities per 100 disintegrations

63 89

5 32 3 1

17,16

3 0 4 ,4

,0 ,0 ,2 3

3 ps

0 0 4 1

3+ ; 1233,8656

0,87 ps

27 fs

4,9 ps

7,4 ps

21,35

0,086

0,238

1,28

57,7 ps

1,400 ns

0,77

1,7

0,0024

0,025

Stable

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 |  |  |  | 0 | | 23 8 3  ,03 ,26 4,5 0,1  0 1 1 | | | | | |  | | | | | | | | | | | | | | | |  | |  | | | |  | 2+ ; 1085,8499 |
| 9 | |  |  |  |  | |  |  | 7  0,1 0,4 | | | 29 6 1 7  19 3 43 84  ,0 ,00 ,1 ,0 | | | | | | | | | | | | | | | |  | |  | | | |  | 3 - ; 1041,1342 |
| 8 | |  |  |  |  | |  |  |  |  |  | 0 | | 0 | | 0 | | 0 | |  | | | |  |  |  |  |  | |  | | | |  | 4 - ; 1022,967 |
| 7 | |  |  |  |  | |  |  |  |  |  | |  | |  | |  | | 3 41  6 3  0,1 0,1 | | | | | | | | |  | |  | | | |  | 1 - ; 963,36 |
| 6 | |  |  |  |  | |  |  |  |  |  | |  | |  | |  | |  | |  | 19 2 41  0,0 0,3 0,8 0,3 | | | | | | 17 | |  | | | |  | 2+ ; 810,4474 |
| 5 | | |  |  | | |  |  |  |  |  | | | |  | |  | |  | |  |  |  | |  |  |  |  | |  | | | |  |  |
|  | | |  | | 31 | | | |  |
|  | | | 0,0 | | 8  ,03 | | | | 6 + ; 706,91 |
| 4 | | |  |  | | |  |  |  |  |  | | | | | |  | |  | |  |  |  | |  |  |  | |  | 0 | | | |  | 0+ ; 684,714 |
| 3 | | |  |  | | |  |  |  |  |  | | | | | |  | |  | |  |  | | |  |  |  | |  | | ,55  7 | | |  | 4+ ; 366,4786 |
| 2 | | | |  | | | |  |  | |  | | | | | | | |  | |  |  | | | |  |  | | | |  | 28 | | ,41 | 2+ ; 121,7818 |
| 1 | | | | | | | | |  | | | | | | | | | | | | |  | | | | |  | | | | | | 0+ ; 0 | | |

0

152

## Sm

62 90

Q + = 1874,3 keV

% + + % = 72,1

0 152

3 - ; 0

-

13,522 (16) a

## Eu 

63 89

 Emission probabilities per 100 disintegrations

0,0203

27 75

0 1

1,826

0,101

0,0536

0,0 0,0

55 36

0 5 3

6

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 |  | 0,0 0,0 0,0 0,0 1,6 0,0 13 42 44 71 15 36 1 -  0 0 0 1 3 3 08 2 ; 1643,395 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 |  |  |  |  |  |  |  | 0,0 0,0 0,0 0,0 0,0 0,0 0,0 3 3 5 +  3 6 3 2 ; 1605,255 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1 2  0,0 0,0 0,0 | | | | 1 | | | | |  | | | | | | | | | |  | 4+ ; 1550,19 |
| 12 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 38 33  7 5 7  0,0 0,1 0,4 1,7 | | | | | 3 | | | | | | | | | |  | 3+ ; 1434,025 |
| 11 |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  | 96 5 8  02 03 13 8  0,0 0,0 0,0 04  0,0 4 9  2 | | | | | | | | | |  | 2+ ; 1318,5 |
| 10 |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  | |  |  | ,01 ,01 | | | | | | |  | 1 ; 1314,71 |
| 9 |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  | |  |  |  | 0 0 | | | | | |  | 4+ ; 1282,267 |
| 8 |  |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | |  |  |  |  | |  |  |  |  |  | 68 2  0 6 9  ,0 ,8 2,  0 0 1 | | | | 7 | 3 - ; 1123,184 |
| 7 |  |  | | |  |  |  |  | |  |  |  |  |  |  |  |  |  | |  |  |  |  | |  |  |  |  |  |  |  |  | 2+ ; 1109,076 | | |
| 6 |  |  | | | |  |  |  | | |  |  |  |  |  | |  |  | | |  |  |  | |  |  |  |  |  |  |  |  | 0+ ; 1047,51 | | |
| 5 |  |  | | | |  |  |  | | | |  |  |  |  | |  |  | | |  |  |  | |  |  |  |  |  |  |  |  | 2+ ; 930,562 | | |
| 4 |  |  | | | | |  |  | | | | |  |  |  | |  |  | | | |  |  | | |  |  |  | |  | |  | 4+ ; 755,3964 | | |
| 3 | |  | | | | |  |  | | | | |  |  |  | | |  | | | | |  | | |  |  |  | | | | | 0+ ; 615,553 | | |
| 2 | |  | | | | |  |  | | | | | |  |  | | |  | | | | |  | | | |  |  | | | | | 2+ ; 344,2798 | | |
| 1 | | | | | | | |  | | | | | | |  | | | | | | | | | | | | | 0 + ; 0 | | | | | | | |

8 1 5

9 33 01 9

6

3+ ; 1692,447

2,44

0,0267

0,0048

0,037

13,8

0,245

0,303

0,904

8,17

7,3 ps

7,3 ps

32,4 ps

0 152

## Gd

64 88

Q - = 1818,8 keV

% - = 27,9

Stable

0 152

3 - ; 0

-

13,522 (16) a

## Eu 

63 89

 Emission probabilities per 100 disintegrations

0,245

09 9 6

8

,0 ,1 ,1

0 0 0 8

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 |  |  | 01  0,0 +  0 ; 1047,51 | | | | | | | |
| 5 |  |  |  | 96 2 29  4 6 7  0,0 0,4 0,0 +  2 ; 930,562 | | | | | | |
| 4 |  |  |  |  |  |  | 8  ,23  2 4+ ; 755,3964 | | | |
| 3 |  |  |  |  |  |  |  | 78  0,0 +  0 ; 615,553 | | |
| 2 | |  |  |  | |  |  |  | ,59  26 2+ ; 344,2798 | |
| 1 | | |  | | | |  | | | 0+ ; 0 |

2+ ; 1109,076

0,303

0,904

8,17

7,3 ps

7,3 ps

32,4 ps

0 152

## Gd

Stable

64 88

Q - = 1818,8 keV

% - = 27,9