$^{123}_{53}\mathrm{I}_{70}$

1 Decay Scheme

I-123 disintegrates by electron capture mainly via the 159 keV level of Te-123 (97%).
L' iode123 se désintègre par capture électronique principalement vers le niveau excité de 159 keV du tellure 123, avec une probabilité de 97%.

2 Nuclear Data

$T_{1/2}(^{123}\mathrm{I})$	:	13,2234	(37)	h
$T_{1/2}(^{123}\mathrm{Te})$	:	12		10^{12} a
$Q^{+}(^{123}\mathrm{I})$	:	1234	(3)	keV

2.1 Electron Capture Transitions

	Energy keV	Probability × 100	Nature	lg ft	P_K	P_L	P_M
$\epsilon_{0,13}$	165,8 (30)	0,0079 (4)	Allowed	7,59	0,8082 (21)	0,1503 (15)	0,0336 (7)
$\epsilon_{0,12}$	197,4 (30)	0,0025 (9)	Allowed	8,27	0,8182 (18)	0,1427 (13)	0,0316 (6)
$\epsilon_{0,11}$	237,9 (30)	0,0035 (3)	1st Forbidden	8,31	0,8266 (16)	0,1363 (12)	0,0300 (6)
$\epsilon_{0,10}$	339,3 (30)	0,0744 (13)	Allowed	7,32	0,8377 (15)	0,1283 (11)	0,0278 (5)
$\epsilon_{0,9}$	450,4 (30)	0,1461 (20)	Allowed	7,29	0,8436 (14)	0,1237 (10)	0,0267 (5)
$\epsilon_{0,8}$	464,7 (30)	0,0037 (6)	Allowed	8,92	0,8441 (14)	0,1233 (10)	0,0266 (5)
$\epsilon_{0,7}$	536,5 (30)	0,419 (13)	Allowed	6,98	0,8464 (14)	0,1216 (10)	0,0262 (5)
$\epsilon_{0,6}$	546 (3)	1,40 (12)	Allowed	6,49	0,8466 (14)	0,1214 (10)	0,0261 (5)
$\epsilon_{0,4}$	728,7 (30)	0,349 (42)	Allowed	7,35	0,8501 (14)	0,1187 (10)	0,0254 (5)
$\epsilon_{0,3}$	744,3 (30)	0,0025 (10)	Allowed	9,52	0,8503 (14)	0,1186 (10)	0,0254 (5)
$\epsilon_{0,2}$	794 (3)	0,419 (5)	Allowed	7,35	0,8510 (14)	0,1181 (10)	0,0253 (5)
$\epsilon_{0,1}$	1075 (3)	97,18 (32)	Allowed	5,26	0,8533 (14)	0,1163 (10)	0,0248 (5)

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_T
$\gamma_{1,0}$(Te)	158,99 (5)	99,22 (30)	M1 + 1,22%E2	0,1648 (16)	0,02160 (22)	0,1918 (19)
$\gamma_{13,10}$(Te)	174,2 (3)	0,00099 (30)	M1 + 50% E2	0,159 (32)	0,029 (12)	0,195 (47)
$\gamma_{6,4}$(Te)	182,61 (8)	0,021 (6)	M1 + 50% E2	0,138 (24)	0,024 (10)	0,168 (38)
$\gamma_{7,4}$(Te)	192,18 (9)	0,0227 (10)	M1 + 50% E2	0,118 (20)	0,020 (8)	0,143 (30)
$\gamma_{10,7}$(Te)	197,22 (11)	0,00037 (19)	M1 + 50% E2	0,109 (18)	0,018 (7)	0,132 (26)
$\gamma_{6,3}$(Te)	198,25 (12)	0,0040 (8)	M1 + 50% E2	0,107 (17)	0,018 (7)	0,130 (26)
$\gamma_{10,6}$(Te)	206,79 (10)	0,0037 (9)	M1 + 50% E2	0,094 (14)	0,016 (5)	0,114 (21)
$\gamma_{7,3}$(Te)	207,82 (13)	0,00125 (36)	M1 + 50% E2	0,093 (14)	0,015 (5)	0,119 (20)
$\gamma_{6,2}$(Te)	247,96 (8)	0,0743 (25)	M1 + 50% E2	0,054 (5)	0,0084 (21)	0,065 (8)
$\gamma_{7,2}$(Te)	257,52 (9)	0,0017 (2)	E2	0,0526 (16)	0,00917 (27)	0,0640 (19)
$\gamma_{9,4}$(Te)	278,26 (8)	0,0024 (4)	M1 + 50% E2	0,0387 (22)	0,0058 (11)	0,0459 (36)
$\gamma_{2,1}$(Te)	281,03 (7)	0,0822 (10)	M1 + 13,2% E2	0,0362 (20)	0,0048 (11)	0,0422 (33)
$\gamma_{10,5}$(Te)	295,17 (21)	0,001582 (4)				
$\gamma_{8,2}$(Te)	329,38 (18)	0,0026 (6)				
$\gamma_{3,1}$(Te)	330,71 (11)	0,01197 (34)	E2	0,0237 (7)	0,00376 (11)	0,0284 (9)
$\gamma_{9,2}$(Te)	343,73 (8)	0,0044 (3)				
$\gamma_{4,1}$(Te)	346,35 (7)	0,1287 (9)	M1 + 0,49% E2	0,02080 (14)	0,00262 (29)	0,02407 (23)
$\gamma_{10,3}$(Te)	405,04 (14)	0,00298 (23)				
$\gamma_{12,5}$(Te)	437,5 (3)	0,0007 (7)				
$\gamma_{2,0}$(Te)	440,02 (5)	0,4280 (44)	M1 + 81,5% E2	0,0103 (7)	0,001452 (18)	0,0121 (7)
$\gamma_{10,2}$(Te)	454,76 (15)	0,00412 (22)				
$\gamma_{4,0}$(Te)	505,34 (6)	0,268 (42)	M1 + 1% E2	0,0081 (7)	0,001063 (27)	0,0093 (7)
$\gamma_{6,1}$(Te)	528,96 (7)	1,28 (12)				
$\gamma_{7,1}$(Te)	538,54 (8)	0,393 (13)	E2 + 50% M3	0,032 (26)	0,0049 (41)	0,038 (31)
$\gamma_{11,2}$(Te)	556,06 (16)	0,0029 (3)				
$\gamma_{13,4}$(Te)	562,84 (12)	0,00115 (7)				
$\gamma_{13,3}$(Te)	578,48 (20)	0,00126 (8)				
$\gamma_{5,0}$(Te)	599,69 (16)	0,00266 (17)				
$\gamma_{8,1}$(Te)	610,27 (23)	0,0011 (3)				
$\gamma_{9,1}$(Te)	624,61 (7)	0,0802 (20)	M1 + 62,8% E2	0,0042 (5)	0,000549 (40)	0,0049 (6)
$\gamma_{13,2}$(Te)	628,26 (22)	0,00164 (14)				
$\gamma_{6,0}$(Te)	687,95 (10)	0,0269 (6)				
$\gamma_{10,1}$(Te)	735,78 (9)	0,0616 (8)				
$\gamma_{9,0}$(Te)	783,62 (6)	0,0591 (11)				
$\gamma_{11,1}$(Te)	837,1 (2)	0,000582 (8)				
$\gamma_{12,1}$(Te)	877,65 (17)	0,00083 (7)				
$\gamma_{10,0}$(Te)	894,8 (2)	0,00101 (7)				
$\gamma_{13,1}$(Te)	909,19 (12)	0,00141 (8)				
$\gamma_{12,0}$(Te)	1036,64 (17)	0,00097 (7)				
$\gamma_{13,0}$(Te)	1068,18 (15)	0,00142 (7)				

3 Atomic Data

3.1 Te

ω_K : 0,875 (4)
$\bar{\omega}_L$: 0,0862 (35)
n_{KL} : 0,917 (4)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	27,202		53,7
	$K\alpha_1$	27,4726		100
	$K\beta_3$	30,9446	}	
	$K\beta_1$	30,996	}	
	$K\beta_5''$	31,236	}	28,6
	$K\beta_5'$	31,241	}	
	$K\beta_2$	31,7008	}	
	$K\beta_4$	31,774	}	6,2
	$KO_{2,3}$	31,812	}	
X_L				
	$L\ell$	3,336		
	$L\alpha$	3,76 – 3,77		
	$L\eta$	3,606		
	$L\beta$	4,02 – 4,37		
	$L\gamma$	4,44 – 4,82		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	21,804 – 22,989	100
KLX	25,814 – 27,470	45,3
KXY	29,80 – 31,81	5,13
Auger L	2,3 – 4,8	

4 Electron Emissions

		Energy keV	Electrons per 100 disint.
e_{AL}	(Te)	2,3 - 4,8	95,3 (6)
e_{AK}	(Te)		12,4 (4)
	KLL	21,804 - 22,989	}
	KLX	25,814 - 27,470	}
	KXY	29,80 - 31,81	}
$ec_{1,0\ K}$	(Te)	127,176 (5)	13,72 (14)
$ec_{1,0\ L}$	(Te)	154,051 - 154,649	1,798 (19)

5 Photon Emissions

5.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Te)	3,336 — 4,82		9,0 (4)	
XKα_2	(Te)	27,202		24,69 (20)	} Kα
XKα_1	(Te)	27,4726		45,98 (29)	}
XKβ_3	(Te)	30,9446	}		
XKβ_1	(Te)	30,996	}	13,16 (17)	K$'\beta_1$
XKβ''_5	(Te)	31,236	}		
XKβ'_5	(Te)	31,241	}		
XKβ_2	(Te)	31,7008	}		
XKβ_4	(Te)	31,774	}	2,86 (8)	K$'\beta_2$
XKO$_{2,3}$	(Te)	31,812	}		

5.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{1,0}$(Te)	158,97 (5)	83,25 (21)
$\gamma_{13,10}$(Te)	174,2 (3)	0,00083 (25)

	Energy keV	Photons per 100 disint.
$\gamma_{6,4}$(Te)	182,61 (6)	0,018 (5)
$\gamma_{7,4}$(Te)	192,17 (7)	0,0199 (7)
$\gamma_{10,7}$(Te)	197,22	0,00033 (17)
$\gamma_{6,3}$(Te)	198,23	0,0035 (7)
$\gamma_{10,6}$(Te)	206,79	0,0033 (8)
$\gamma_{7,3}$(Te)	207,8	0,00112 (32)
$\gamma_{6,2}$(Te)	247,96 (5)	0,0698 (23)
$\gamma_{7,2}$(Te)	257,51 (15)	0,0016 (2)
$\gamma_{9,4}$(Te)	278,36 (12)	0,0023 (4)
$\gamma_{2,1}$(Te)	281,03 (5)	0,0789 (9)
$\gamma_{10,5}$(Te)	295,17	0,001582 (4)
$\gamma_{8,2}$(Te)	329,38 (17)	0,0026 (6)
$\gamma_{3,1}$(Te)	330,70 (8)	0,01164 (33)
$\gamma_{9,2}$(Te)	343,73 (14)	0,0044 (3)
$\gamma_{4,1}$(Te)	346,35 (5)	0,1257 (9)
$\gamma_{10,3}$(Te)	405,02 (13)	0,00298 (23)
$\gamma_{12,5}$(Te)	437,5 (3)	0,0007 (7)
$\gamma_{2,0}$(Te)	440,02 (5)	0,4229 (43)
$\gamma_{10,2}$(Te)	454,76 (15)	0,00412 (22)
$\gamma_{4,0}$(Te)	505,33 (5)	0,266 (42)
$\gamma_{6,1}$(Te)	528,96 (5)	1,28 (12)
$\gamma_{7,1}$(Te)	538,54 (5)	0,3788 (43)
$\gamma_{11,2}$(Te)	556,05 (13)	0,0029 (3)
$\gamma_{13,4}$(Te)	562,79 (12)	0,00115 (7)
$\gamma_{13,3}$(Te)	578,26 (20)	0,00126 (8)
$\gamma_{5,0}$(Te)	599,69 (16)	0,00266 (17)
$\gamma_{8,1}$(Te)	610,05 (23)	0,0011 (3)
$\gamma_{9,1}$(Te)	624,57 (5)	0,0798 (20)
$\gamma_{13,2}$(Te)	628,26 (22)	0,00164 (14)
$\gamma_{6,0}$(Te)	687,95 (10)	0,0269 (6)
$\gamma_{10,1}$(Te)	735,78 (7)	0,0616 (8)
$\gamma_{9,0}$(Te)	783,59 (6)	0,0591 (11)
$\gamma_{11,1}$(Te)	837,1 (2)	0,000582 (8)
$\gamma_{12,1}$(Te)	877,52 (17)	0,00083 (7)
$\gamma_{10,0}$(Te)	894,8 (2)	0,00101 (7)
$\gamma_{13,1}$(Te)	909,12 (12)	0,00141 (8)
$\gamma_{12,0}$(Te)	1036,63 (17)	0,00097 (7)
$\gamma_{13,0}$(Te)	1068,12 (15)	0,00142 (7)

6 Main Production Modes

$\left\{ \begin{array}{l} \mathrm{Sb-121}(\alpha,\mathrm{2n})\mathrm{I-123} \\ \text{Possible impurities : } \mathrm{I-121},\ \mathrm{I-124},\ \mathrm{I-125},\ \mathrm{I-126} \end{array} \right.$

$\mathrm{I-127(p,5n)Xe-123}$

$\left\{ \begin{array}{l} \mathrm{Te-124(p,2n)I-123} \\ \text{Possible impurities : } \mathrm{I-124},\ \mathrm{I-126},\ \mathrm{I-125} \end{array} \right.$

$\left\{ \begin{array}{l} \mathrm{Te-123(p,n)I-123} \\ \text{Possible impurities : } \mathrm{I-124},\ \mathrm{I-126},\ \mathrm{I-130},\ \mathrm{I-125} \end{array} \right.$

$\left\{ \begin{array}{l} \mathrm{Te-122}(\alpha,\mathrm{3n})\mathrm{Xe-123} \\ \text{Possible impurities : } \mathrm{I-125} \end{array} \right.$

$\left\{ \begin{array}{l} \mathrm{Te-123(He-3,3n)Xe-123} \\ \text{Possible impurities : } \mathrm{I-125} \end{array} \right.$

$\left\{ \begin{array}{l} \mathrm{Te-124(He-3,4n)Xe-123} \\ \text{Possible impurities : } \mathrm{I-125} \end{array} \right.$

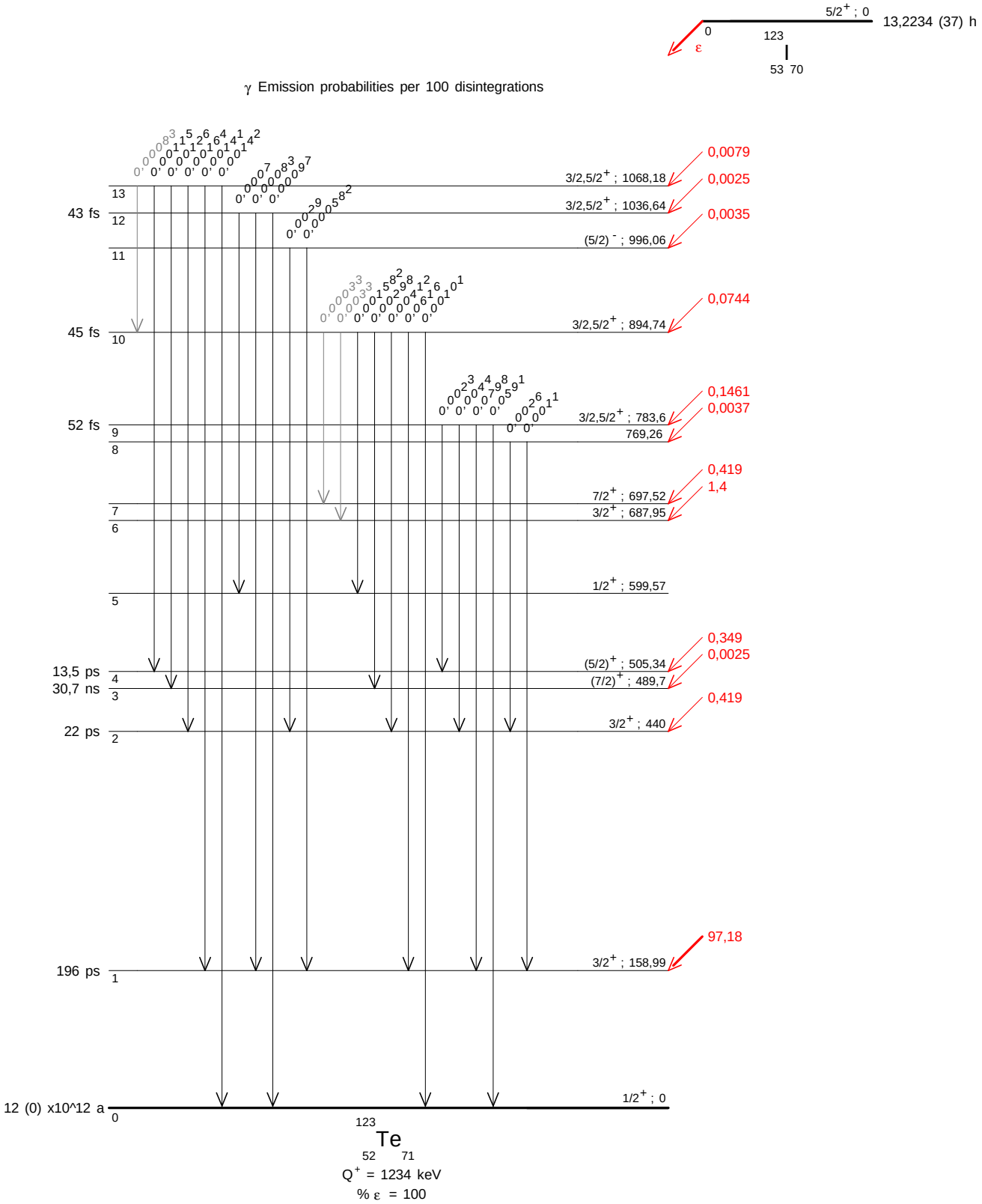
$\left\{ \begin{array}{l} \mathrm{Te-122(d,n)I-123} \\ \text{Possible impurities : } \mathrm{I-124},\ \mathrm{I-126},\ \mathrm{I-131},\ \mathrm{I-125} \end{array} \right.$

7 References

- R. K. Gupta. Nucl. Phys. 14 (1960) 606
  (Gamma-ray Emission, emission probabilities)
- G. Anderson, G. Rudstam, G. Sorensen. Ark. Fys. 28 (1964) 3
  (Half-life)
- Y. Y. Chu, O. C. Kistner, A. C. Li, S. Monaro, M. L. Perlman. Phys. Rev. 133 (1964) B1316
  (E2/M1 ratios)
- Y. Y. Chu, M. L. Perlman. Phys. Rev. 135 (1964) B319
  (internal conversion coefficients)
- E. N. Hatch, G. W. Eakins, G. C. Nelson, R. E. Mcadams. Proc. Inter. Conf. : Internal Conversion Process (1965)
  (Internal Conversion Coefficient)
- H. Sergole, G. Albouy, J. Bouloume, J. M. Lagrange, L. Marcus, M.Pautrat. J. Phys. (Paris) 28 (1967) 383
  (Gamma-ray Emissions)
- G. G. Jonsson, B. Forkman. Nucl. Phys. A 107 (1968) 52
  (Half-life)
- H. B. Hupf, J. S. Eldridge, J. E. Breaver. Int. J. Appl. Radiat. Isotop. 19 (1968) 345
  (Half-Life)
- R. C. Ragaini, W. B. Walters, G. E. Gordon, P. A. Baedecker. Nucl. Phys. A 115 (1968) 611
  (Gamma-ray Emissions)
- B. V. Narasimha Rao, Swani Jnanananda. Phys. Rev. 165 (1968) 1296
  (E2 transitions)
- H. Sergole, G. Albouy, M. Jourdain, J. M. Lagrange, N. Poffe, M.Pautrat. J. Phys. (Paris) C1 (1968) 187
  (Gamma-ray Emissions)
- H. Sergole, J. Vanhorenbeeck. Nucl. Phys. A 139 (1969) 554
  (Gamma-ray emissions, angular correlactions)
- E. H. Spejewski, P. K. Hopke, F. W. Loeser Jr. Nucl. Phys. A 146 (1970) 182
  (Gamma ray energy and intensity)
- H. Schrader, R. Stippler, F. Munich. Nucl. Phys. A 151 (1970) 331
  (Gamma-ray emission, emission probabilities)

- A. Hogleend, S. G. Malmstog, F. Munich, H. Schrader. Nucl. Phys. A 165 (1971) 513
  (M1 and E2 transitions)
- R. Stippler, D. Code, H. Schrader, F. Munich. Z. Phys. 242 (1971) 121
  (Gamma-ray emission, K-shell conversion coefficient)
- H. C. Cheung, S. K. Mark. Nucl. Phys. A 176 (1971) 489
  (Half-life)
- S. Raman. Nucl. Instrum. Methods 103 (1972) 407
  (Internal Conversion Coefficient)
- H. M. A. Karim. Radiochim. Acta 19 (1973) 1
  (Half-life)
- V. J. Sodd, J. W. Blue, K. L. Scholz, M. C. Oselka. Int. J. Appl. Radiat. Isotop. 24 (1973) 171
  (Gamma ray energy and intensity)
- W. N. Roney, D. W. Gebbie, R. R. Borchers. Nucl. Phys. A236 (1974) 165
  (Mixing of different multipolarities)
- W. B. Walters, R. A. Meyer. Phys. Rev. C14 (1976) 1925
  (Gamma-ray energy and intensity)
- D. B. Fossan, *et al.* Phys. Rev. C15 (1977) 1732
  (Gamma-ray transitions, spin and parity)
- U. Hagemann, H.-J. Keller, H.-F. Brinckman. Nucl. Phys. A289 (1977) 292
  (Gamma-ray energy and intensity)
- K. S. Krane. At. Data. Nucl. Data Tables 19 (1977) 363
  (E2, M1 multipole mixing ratios)
- E. Schoeters, J. Geenen, C. Nuytten, L. Vanneste. Nucl. Phys. A323 (1979) 1
  (J, mixing of different multipolarities)
- R. E. Shroy, *et al.* Phys. Rev. C26 (1982) 1089
  (Gamma-ray emission probabilities)
- F. Lagoutine, J. Legrand. Int. J. Appl. Radiat. Isotop. 33 (1982) 711
  (Half-life)
- R. Jacquemin. Int. J. Appl. Radiat. Isotop. 38 (1987) 1087
  (Half-life)
- M. P. Unterweger, D. D. Hoppes, F. J. Schima. Nucl. Instrum. Methods A312 (1992) 349
  (Half-life)
- S. Ohya, T. Tamura. Nucl. Data Sheets 70 (1993) 531
  (Spin, Parity)
- R. Goswani, B. Sethi, P. Barnerjee, P. K. Chattopadhyay. Phys. Rev. C47 (1993) 1013
  (Gamma-ray energy)
- E. Schönfeld, H. Janssen. Nucl. Instrum. Methods A369 (1996) 527
  (Atomic data)
- M. A. L. da Silva, M. C. M. de Almeida, C. J. da Silva, J. U. Delgado. Appl. Rad. Isotopes 60 (2004) 301
  (Half-life)
- H. Schrader. Appl. Rad. Isotopes 60 (2004) 317
  (Half-life)

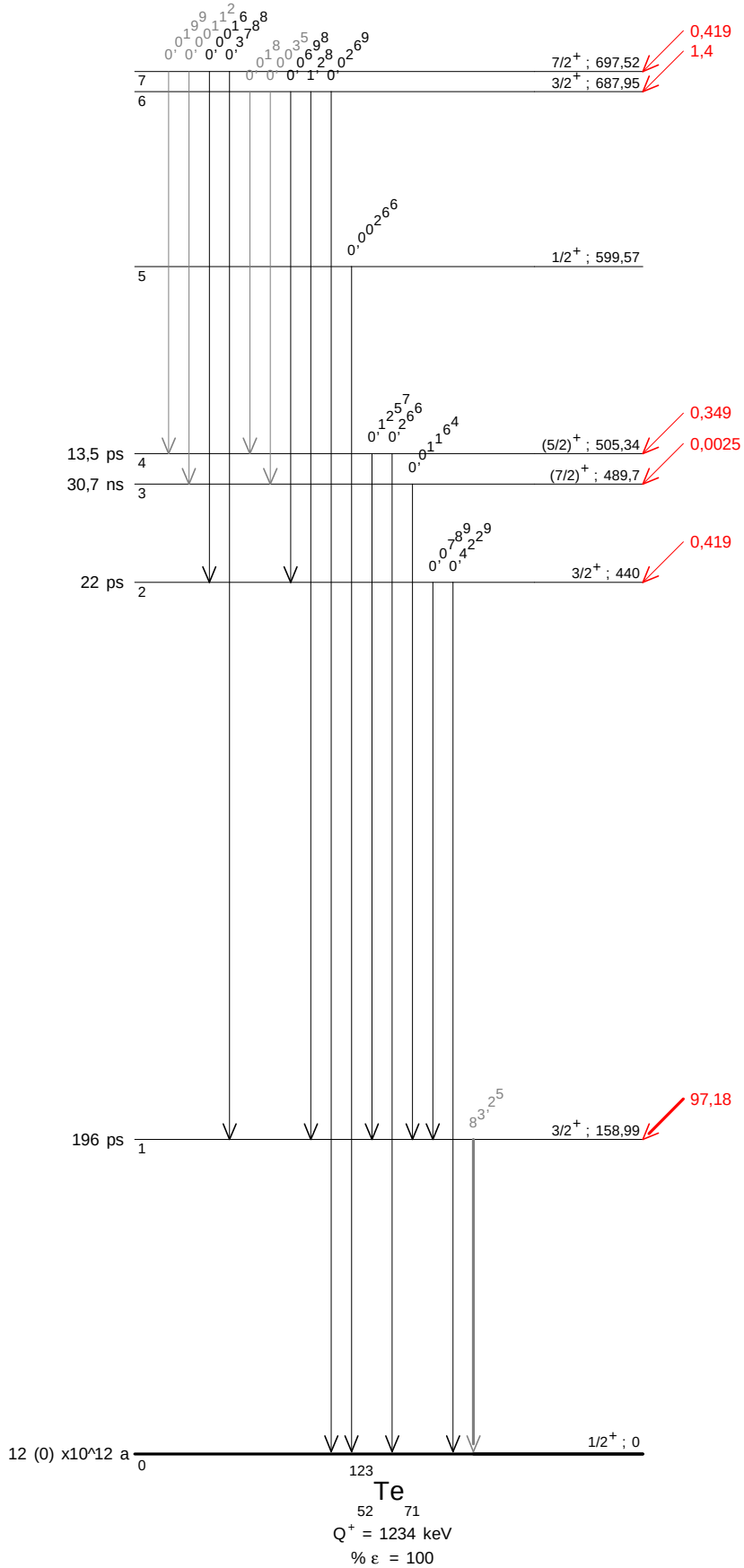
$^{123}_{53}I_{70}$


5/2+ ; 0
13,2234 (37) h
0
ε
123
53 70
γ Emission probabilities per 100 disintegrations
0,0079
0,0025
0,0035
0,0744
0,1461
0,0037
0,419
1,4
0,349
0,0025
0,419
97,18
3/2,5/2+ ; 1068,18
3/2,5/2+ ; 1036,64
(5/2) - ; 996,06
3/2,5/2+ ; 894,74
3/2,5/2+ ; 783,6
769,26
7/2+ ; 697,52
3/2+ ; 687,95
1/2+ ; 599,57
(5/2)+ ; 505,34
(7/2)+ ; 489,7
3/2+ ; 440
3/2+ ; 158,99
1/2+ ; 0
43 fs
52 fs
45 fs
13,5 ps
30,7 ns
22 ps
196 ps
12 (0) x10^12 a
13
12
11
10
9
8
7
6
5
4
3
2
1
0
123
Te
52 71
Q+ = 1234 keV
% ε = 100

123
I
53 70

5/2+ ; 0
13,2234 (37) h
0
123
I
53 70
ε

γ Emission probabilities per 100 disintegrations



123
Te
52 71

Q+ = 1234 keV

% ε = 100