1 Half-life, Q-value and Decay mode

$T_{1/2}$	:	704	(1)	$\times 10^{6}$ y
Q_{α}	:	4678.3	(7)	keV
α	:	100		%
SF	:	7	(2)	$\times 10^{-9}$ %

2 α Emissions

	Energy keV	Probability × 100
$\alpha_{0,22}$	3976 (5)	≈0.0011
$\alpha_{0,21}$	4013.2 (8)	0.0396 (10)
$\alpha_{0,20}$	4077.5 (7)	0.016 (12)
$\alpha_{0,19}$	4152 (5)	0.294 (13)
$\alpha_{0,18}$	4214.7 (19)	5.95 (12)
$\alpha_{0,17}$	4219.5 (7)	0.01732 (12)
$\alpha_{0,16}$	4227.6 (7)	0.122 (6)
$\alpha_{0,15}$	4248 (5)	0.069 (10)
$\alpha_{0,14}$	4266 (5)	0.22 (3)
$\alpha_{0,13}$	4279.3 (7)	0.0329 (5)
$\alpha_{0,12}$	4286.9 (7)	0.065 (13)
$\alpha_{0,11}$	4302.1 (7)	0.00959 (13)
$\alpha_{0,10}$	4322 (4)	3.33 (6)
$\alpha_{0,9}$	4327.9 (7)	0.405 (13)
$\alpha_{0,8}$	4361.9 (7)	0.206 (21)
$\alpha_{0,7}$	4366.1 (20)	18.80 (13)
$\alpha_{0,6}$	4381.1 (7)	0.106 (16)
$\alpha_{0,5}$	4397.8 (13)	57.19 (20)
$\alpha_{0,4}$	4414.9 (5)	3.01 (16)
$\alpha_{0,3}$	4437.9 (40)	0.236 (25)
$\alpha_{0,2}$	4502.4 (7)	1.28 (5)
$\alpha_{0,1}$	4556.0 (4)	3.79 (6)
$\alpha_{0,0}$	4596.4 (13)	4.74 (6)

3 Electron Emissions

		Energy keV	Electrons per 100 disint.
e_{AL}	(Th)	5.8 - 20.3	24 (3)
e_{AK}	(Th)		0.381 (9)
	KLL	68.406 - 76.745 }	
	KLX	83.857 - 93.345 }	
	KXY	99.29 - 109.64 }	
$ec_{7,5\ L}$	(Th)	11.117 - 15.300	8.3 (29)
$ec_{10,7\ L}$	(Th)	20.6 - 24.8	1.09 (42)
$ec_{1,0\ L}$	(Th)	21.484 - 25.700	18.2 (32)

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		Energy keV	Electrons per 100 disint.
$ec_{7,5}$ M	(Th)	26.407 - 28.257	2.2 (8)
$ec_{7,5}$ N	(Th)	30.260 - 31.254	0.60 (23)
$ec_{7,4}$ L	(Th)	30.709 - 34.900	6.8 (14)
$ec_{9,6}$ L	(Th)	33.602 - 37.800	0.1771 (34)
$ec_{10,7}$ M	(Th)	35.9 - 37.8	0.26 (10)
$ec_{1,0}$ M	(Th)	36.774 - 38.624	4.9 (9)
$ec_{10,7}$ N	(Th)	39.8 - 40.8	0.070 (27)
$ec_{1,0}$ N	(Th)	40.630 - 41.621	1.32 (23)
$ec_{19,18}$ L	(Th)	43.87 - 48.00	0.1850 (27)
$ec_{7,4}$ M	(Th)	45.999 - 47.849	1.87 (39)
$ec_{9,6}$ M	(Th)	48.892 - 50.742	0.0484 (8)
$ec_{7,4}$ N	(Th)	49.850 - 50.846	0.5 (1)
$ec_{9,6}$ N	(Th)	52.740 - 53.739	0.01296 (22)
$ec_{19,18}$ M	(Th)	59.16 - 61.01	0.0445 (7)
$ec_{19,18}$ N	(Th)	63.01 - 64.01	0.01188 (18)
$ec_{2,0}$ L	(Th)	75.66 - 79.80	0.90 (11)
$ec_{4,0}$ K	(Th)	76.072 (4)	5.06 (8)
$ec_{2,0}$ M	(Th)	90.95 - 92.80	0.248 (30)
$ec_{2,0}$ N	(Th)	94.8 - 95.8	0.067 (8)
$ec_{4,0}$ L	(Th)	165.25 - 169.40	1.020 (18)
$ec_{4,0}$ M	(Th)	180.54 - 182.39	0.2468 (37)
$ec_{4,0}$ N	(Th)	184.390 - 185.387	0.0651 (10)

4 Photon Emissions

4.1 X-Ray Emissions

		Energy keV	Photons per 100 disint.	
XL	(Th)	11.1177 — 19.5043	22 (3)	
$XK\alpha_2$	(Th)	89.954	3.56 (9)	} $K\alpha$
$XK\alpha_1$	(Th)	93.351	5.76 (14)	}
$XK\beta_3$	(Th)	104.819	}	
$XK\beta_1$	(Th)	105.604	} 2.06 (5)	$K\beta'_1$
$XK\beta''_5$	(Th)	106.239	}	
$XK\beta_2$	(Th)	108.509	}	
$XK\beta_4$	(Th)	108.955	} 0.685 (18)	$K\beta'_2$
$XKO_{2,3}$	(Th)	109.442	}	

4.2 Gamma Transitions and Emissions

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_T	P_γ × 100
$\gamma_{7,5}$(Th)	31.60 (5)	11.4 (40)	M1+E2	667	0.017 (6)
$\gamma_{10,7}$(Th)	41.4 (3)	1.5 (6)	[M1]	49.9 (13)	0.029 (11)
$\gamma_{1,0}$(Th)	42.01 (6)	24.7 (43)	M1+E2	440 (30)	0.056 (9)
$\gamma_{7,4}$(Th)	51.21 (4)	9.4 (19)	[E2]	274 (4)	0.034 (7)
$\gamma_{9,6}$(Th)	54.1 (1)	0.24	[E2]	210 (4)	0.00115
$\gamma_{2,1}$(Th)	54.25 (5)	2.1	[M1+E2]	71 (3)	0.0285
$\gamma_{19,18}$(Th)	64.45 (5)	0.26	[M1]	13.6 (2)	0.018
$\gamma_{10,5}$(Th)	72.7 (2)	1.86	M1+E2	15 (3)	0.116
$\gamma_{7,3}$(Th)	74.94 (3)	0.064 (8)	[E1]	0.252 (4)	0.051 (6)
$\gamma_{2,0}$(Th)	96.09 (2)	1.33 (16)	[E2]	13.58 (19)	0.091 (11)
$\gamma_{14,7}$(Th)	97 (4)	0.22 (7)	[E2]	13 (3)	0.016 (4)
$\gamma_{5,2}$(Th)	109.19 (7)	1.81 (14)	[E1]	0.0932 (14)	1.66 (13)
$\gamma_{10,3}$(Th)	115.45 (5)	0.040 (13)	[E1]	0.348 (5)	0.03 (1)
$\gamma_{3,1}$(Th)	120.35 (5)	0.31	[M1]	10.95 (16)	0.026
$\gamma_{16,8}$(Th)	136.55 (5)	0.103	[M1]	7.66 (11)	0.012
$\gamma_{7,2}$(Th)	140.76 (2)	0.244 (12)	[E1]	0.218 (3)	0.20 (1)
$\gamma_{20,18}$(Th)	142.40 (5)	0.018	[E2]	2.48 (4)	0.0051
$\gamma_{4,1}$(Th)	143.767 (3)	13.20 (8)	E1	0.207 (3)	10.94 (6)
$\gamma_{18,7}$(Th)	150.936 (15)	0.61 (20)	[M1]	5.76 (8)	0.09 (3)
$\gamma_{5,1}$(Th)	163.356 (3)	5.855 (36)	(E1)	0.1526 (22)	5.08 (3)
$\gamma_{16,5}$(Th)	173 (1)	0.007 (6)	[E1]	0.133 (3)	0.006 (5)
$\gamma_{18,5}$(Th)	182.62 (5)	1.70 (22)	[M1]	3.36 (5)	0.39 (5)
$\gamma_{4,0}$(Th)	185.720 (4)	63.41 (35)	E1	0.1124 (16)	57.0 (3)
$\gamma_{7,1}$(Th)	194.940 (6)	0.693 (11)	[E1]	0.1002 (14)	0.63 (1)
$\gamma_{8,1}$(Th)	198.894 (14)	0.131 (7)	M1	2.64 (4)	0.036 (2)
$\gamma_{18,4}$(Th)	202.12 (1)	3.81 (8)	[M1]	2.53 (4)	1.08 (2)
$\gamma_{5,0}$(Th)	205.316 (4)	5.465 (33)	(E1)	0.0887 (13)	5.02 (3)
$\gamma_{19,7}$(Th)	215.28 (4)	0.090 (9)	[M1]	2.12 (3)	0.029 (3)
$\gamma_{6,0}$(Th)	221.386 (14)	0.349 (15)	M1	1.96 (3)	0.118 (5)
$\gamma_{13,2}$(Th)	228.76 (5)	0.021	M1	1.79 (3)	0.0074
$\gamma_{9,1}$(Th)	233.50 (2)	0.102 (11)	M1	1.687 (24)	0.038 (4)
$\gamma_{8,0}$(Th)	240.88 (4)	0.181 (19)	M1(+E2)	1.45 (22)	0.074 (4)
$\gamma_{19,5}$(Th)	246.83 (2)	0.134 (7)	[M1]	1.445 (21)	0.055 (3)
$\gamma_{15,2}$(Th)	255.365 (10)	0.017	M1	1.315 (19)	0.0074
$\gamma_{19,4}$(Th)	266.47 (4)	0.0097 (7)	[E2]	0.245 (4)	0.0078 (6)
$\gamma_{12,1}$(Th)	275.35 (15)	0.094 (11)	M1+E2	0.84 (6)	0.051 (6)
$\gamma_{9,0}$(Th)	275.49 (6)	0.065	M1(+E2)	1.02 (12)	0.032
$\gamma_{16,2}$(Th)	281.42 (5)	0.013	M1	1.005 (14)	0.0063
$\gamma_{13,1}$(Th)	282.94 (5)	0.013	[M1]	0.990 (14)	0.0063
$\gamma_{17,2}$(Th)	289.56 (4)	0.0142	[M1]	0.929 (13)	0.0074
$\gamma_{18,2}$(Th)	291.65 (3)	0.042 (6)	[E1]	0.0396 (6)	0.040 (6)
$\gamma_{11,0}$(Th)	301.7 (1)	0.01	M1	0.829 (12)	0.0053
$\gamma_{15,1}$(Th)	310.69 (6)	0.011	(E2)	0.1517 (22)	0.0094
$\gamma_{12,0}$(Th)	317.10 (8)	0.0019	M1	0.723 (11)	0.0011
$\gamma_{17,1}$(Th)	343.5 (2)	0.0032			0.0032
$\gamma_{18,1}$(Th)	345.92 (3)	0.041 (6)	[E1]	0.0272 (4)	0.040 (6)
$\gamma_{15,0}$(Th)	350 (5)	0.009	M1	0.552 (24)	0.006

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_T	P_γ × 100
$\gamma_{19,2}$(Th)	356.03 (5)	0.0054	[E1]	0.0255 (4)	0.0053
$\gamma_{18,0}$(Th)	387.84 (3)	0.041 (6)	[E1]	0.0213 (3)	0.040 (6)
$\gamma_{21,5}$(Th)	390.27 (20)	0.040 (1)			0.040 (1)
$\gamma_{19,1}$(Th)	410.29 (4)	0.0033	[E1]	0.0189 (3)	0.0032
$\gamma_{22,4}$(Th)	448.40 (6)	0.0011			0.0011

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