

## 1 Half-life, Q-value and Decay mode

$T_{1/2}$	:	22.15	(8)	min
$Q_{\beta^-}$	:	1243.1	(14)	keV
$\beta^-$	:	100		%

## 2 $\beta^-$ Transitions

	Energy keV	Probability $\times 100$	Nature	$\log ft$
$\beta_{0,20}^-$	224.4 (14)	0.0434 (9)		6.7
$\beta_{0,19}^-$	258.3 (14)	0.205 (2)	Allowed	6.2
$\beta_{0,18}^-$	431.5 (14)	0.385 (4)	Allowed	6.6
$\beta_{0,17}^-$	478.5 (14)	1.19 (3)	Allowed	6.3
$\beta_{0,16}^-$	573.2 (14)	0.0174 (22)	1st forbidden	8.4
$\beta_{0,15}^-$	657.6 (14)	0.15 (3)	Allowed	7.6
$\beta_{0,14}^-$	689.2 (14)	1.23 (3)	Allowed	6.8
$\beta_{0,13}^-$	788.7 (14)	0.217 (13)	Allowed	7.7
$\beta_{0,12}^-$	795.3 (14)	0.821 (14)	1st forbidden	7.2
$\beta_{0,11}^-$	985.8 (14)	0.60 (3)	1st forbidden unique	8.1
$\beta_{0,8}^-$	1041.4 (14)	0.074 (8)	Allowed	8.6
$\beta_{0,7}^-$	1073.9 (14)	0.692 (12)	Allowed	7.7
$\beta_{0,5}^-$	1148.4 (14)	10.4 (4)	Allowed	6.6
$\beta_{0,1}^-$	1236.4 (14)	50 (6)	1st forbidden	6.1
$\beta_{0,0}^-$	1243.1 (14)	34 (6)	1st forbidden	6.2

## 3 Electron Emissions

		Energy keV	Electrons per 100 disint.	Energy keV
e <sub>AL</sub>	(Pa)	5.9 - 21.6	8.6 (10)	
e <sub>AK</sub>	(Pa)		0.041 (5)	
	KLL	70.081 - 78.822	}	
	KLX	88.03 - 95.56	}	
	KXY	101.78 - 112.40	}	
ec <sub>1,0</sub> M	(Pa)	1.29 - 3.21	34.2 (9)	
ec <sub>8,4</sub> K	(Pa)	2.54 (5)	0.013	
ec <sub>9,5</sub> K	(Pa)	5.10 (2)	0.0270 (31)	
ec <sub>1,0</sub> N	(Pa)	5.27 - 6.30	9.27 (26)	
ec <sub>4,2</sub> L	(Pa)	8.268 - 12.640	4.97 (19)	
ec <sub>8,3</sub> K	(Pa)	18.5 (1)	0.013	
ec <sub>10,6</sub> K	(Pa)	21.689 (20)	0.015	
ec <sub>4,2</sub> M	(Pa)	24.012 - 25.931	1.272 (49)	
ec <sub>4,2</sub> N	(Pa)	27.990 - 29.018	0.332 (12)	
ec <sub>10,5</sub> K	(Pa)	30.63 (2)	0.057 (16)	
ec <sub>2,0</sub> L	(Pa)	36.0 - 40.4	6.39 (23)	
ec <sub>10,4</sub> K	(Pa)	38.9 (2)	0.034	

		Energy keV		Electrons per 100 disint.		Energy keV
ec <sub>3,1</sub> L	(Pa)	42.82	- 47.19	0.052	(22)	
ec <sub>3,0</sub> L	(Pa)	49.38	- 53.76	0.020	(17)	
ec <sub>7,1</sub> K	(Pa)	49.908	(12)	0.0206	(6)	
ec <sub>11,5</sub> K	(Pa)	50		0.01968	(29)	
ec <sub>2,0</sub> M	(Pa)	51.7	- 53.7	1.76	(6)	
ec <sub>7,5</sub> L	(Pa)	53.40	- 57.78	0.299	(14)	
ec <sub>2,0</sub> N	(Pa)	55.7	- 56.7	0.475	(16)	
ec <sub>7,0</sub> K	(Pa)	56.57	(1)	0.0281	(7)	
ec <sub>11,4</sub> K	(Pa)	58.00	(6)	0.0557	(14)	
ec <sub>3,1</sub> M	(Pa)	58.56	- 60.48	0.014	(6)	
ec <sub>4,0</sub> L	(Pa)	65.372	- 69.744	2.08	(8)	
ec <sub>17,15</sub> K	(Pa)	66.45	(8)	0.075	(22)	
ec <sub>5,1</sub> L	(Pa)	66.88	- 71.26	0.0217	(6)	
ec <sub>7,5</sub> M	(Pa)	69.15	- 71.07	0.0720	(34)	
ec <sub>7,5</sub> N	(Pa)	73.13	- 74.16	0.0193	(9)	
ec <sub>5,0</sub> L	(Pa)	73.54	- 77.91	0.0814	(18)	
ec <sub>11,3</sub> K	(Pa)	74.20	(18)	0.031	(27)	
ec <sub>12,11</sub> K	(Pa)	77.956	(14)	0.224	(6)	
ec <sub>4,0</sub> M	(Pa)	81.116	- 83.035	0.41	(7)	
ec <sub>5,0</sub> M	(Pa)	89.29	- 91.21	0.01992	(45)	
ec <sub>17,14</sub> K	(Pa)	98.07	(8)	0.020	(16)	
ec <sub>13,10</sub> K	(Pa)	104	(2)	0.029		
ec <sub>18,15</sub> K	(Pa)	113.5	(2)	0.0275	(12)	
ec <sub>10,5</sub> L	(Pa)	122.12	- 126.50	0.0138	(20)	
ec <sub>10,4</sub> L	(Pa)	130.4	- 134.8	0.011		
ec <sub>13,8</sub> K	(Pa)	140.18	(9)	0.014		
ec <sub>11,0</sub> K	(Pa)	144.70	(15)	0.031	(31)	
ec <sub>11,4</sub> L	(Pa)	149.5	- 153.9	0.01166	(33)	
ec <sub>17,15</sub> L	(Pa)	157.95	- 162.32	0.0167	(6)	
ec <sub>11,3</sub> L	(Pa)	165.7	- 170.1	0.0111	(5)	
ec <sub>12,11</sub> L	(Pa)	169.447	- 173.819	0.0430	(11)	
ec <sub>13,7</sub> K	(Pa)	172.64	(7)	0.017		
ec <sub>12,11</sub> M	(Pa)	185.191	- 187.110	0.01037	(27)	
ec <sub>12,3</sub> K	(Pa)	264.67	(11)	0.015		
ec <sub>12,1</sub> K	(Pa)	328.34	(4)	0.046	(8)	
ec <sub>12,0</sub> K	(Pa)	335.17	(2)	0.0240	(42)	
ec <sub>14,5</sub> K	(Pa)	346.626	(7)	0.227	(6)	
ec <sub>12,3</sub> L	(Pa)	356.2	- 360.6	0.029		
ec <sub>15,5</sub> K	(Pa)	378.2	(6)	0.035		
ec <sub>15,4</sub> K	(Pa)	386.42	(4)	0.042		
ec <sub>14,5</sub> L	(Pa)	438.117	- 442.489	0.043	(1)	
ec <sub>17,8</sub> K	(Pa)	450.33	(8)	0.01		
ec <sub>14,5</sub> M	(Pa)	453.861	- 455.780	0.01035	(24)	
ec <sub>17,7</sub> K	(Pa)	482.79	(6)	0.02		
ec <sub>17,5</sub> K	(Pa)	557.305	(16)	0.0423	(10)	
$\beta_{0,20}^-$	max:	224.4	(14)	0.0434	(9)	avg: 60.9 (4)
$\beta_{0,19}^-$	max:	258.3	(14)	0.205	(2)	avg: 70.8 (4)
$\beta_{0,18}^-$	max:	431.5	(14)	0.385	(4)	avg: 124.3 (5)

		Energy keV		Electrons per 100 disint.		Energy keV
$\beta_{0,17}^-$	max:	478.5	(14)	1.19	(3)	avg: 139.5 (5)
$\beta_{0,16}^-$	max:	573.2	(14)	0.0174	(22)	avg: 170.8 (5)
$\beta_{0,15}^-$	max:	657.6	(14)	0.15	(3)	avg: 199.6 (5)
$\beta_{0,14}^-$	max:	689.2	(14)	1.23	(3)	avg: 210.5 (5)
$\beta_{0,13}^-$	max:	788.7	(14)	0.217	(13)	avg: 245.5 (5)
$\beta_{0,12}^-$	max:	795.3	(14)	0.821	(14)	avg: 247.8 (5)
$\beta_{0,11}^-$	max:	985.8	(14)	0.60	(3)	avg: 317.0 (6)
$\beta_{0,8}^-$	max:	1041.4	(14)	0.074	(8)	avg: 337.6 (6)
$\beta_{0,7}^-$	max:	1073.9	(14)	0.692	(12)	avg: 349.7 (6)
$\beta_{0,5}^-$	max:	1148.4	(14)	10.4	(4)	avg: 377.8 (6)
$\beta_{0,1}^-$	max:	1236.4	(14)	50	(6)	avg: 411.2 (6)
$\beta_{0,0}^-$	max:	1243.1	(14)	34	(6)	avg: 413.8 (6)

## 4 Photon Emissions

### 4.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Pa)	11.366 — 21.6		8.2	(9)
XK $\alpha_2$	(Pa)	92.288		0.39	(1) } K $\alpha$
XK $\alpha_1$	(Pa)	95.869		0.615	(13) }
XK $\beta_3$	(Pa)	107.595	}		
XK $\beta_1$	(Pa)	108.422	}	0.235	(6) K $\beta'_1$
XK $\beta''_5$	(Pa)	109.072	}		
XK $\beta_2$	(Pa)	111.405	}		
XK $\beta_4$	(Pa)	111.87	}	0.079	(3) K $\beta'_2$
XK $O_{2,3}$	(Pa)	112.38	}		

### 4.2 Gamma Transitions and Emissions

	Energy keV	$P_{\gamma+ce}$ $\times 100$	Multipolarity	$\alpha_T$	$P_\gamma$ $\times 100$
$\gamma_{1,0}$ (Pa)	6.65 (5)	51 (6)	(M1)	3080 (60)	0.0165 (18)
$\gamma_{4,2}$ (Pa)	29.373 (10)	8.83 (31)	E1	3.07 (6)	2.17 (7)
$\gamma_{2,0}$ (Pa)	57.10 (2)	8.81 (33)	E2	176 (4)	0.0498 (15)
$\gamma_{3,1}$ (Pa)	63.92 (6)	0.072 (31)	(E2)	102.1 (21)	0.0007 (3)
$\gamma_{3,0}$ (Pa)	70.49 (10)	0.029 (27)	[M1+E2]	40 (30)	0.0007 (4)
$\gamma_{7,5}$ (Pa)	74.51 (5)	0.436 (20)	[M1]	9.85 (20)	0.0402 (17)
$\gamma_{4,0}$ (Pa)	86.477 (10)	4.48 (16)	E1	1.43 (8)	1.843 (22)
$\gamma_{5,1}$ (Pa)	87.99 (3)	0.1985 (24)	[E1]	0.169 (3)	0.1698 (20)
$\gamma_{5,0}$ (Pa)	94.65 (5)	0.884 (11)	E1	0.140 (3)	0.775 (9)

	Energy keV	$P_{\gamma+ce}$ $\times 100$	Multipolarity	$\alpha_T$	$P_\gamma$ $\times 100$
$\gamma_{-1,2}(\text{Pa})$	105.2 (1)	0.041			0.041
$\gamma_{9,6}(\text{Pa})$	108.5 (1)	0.0027	M1+E2	3.5 (6)	0.0006
$\gamma_{8,4}(\text{Pa})$	115.14 (5)	0.03 (8)	[M1+E2]	10 (4)	0.003 (7)
$\gamma_{9,5}(\text{Pa})$	117.692 (20)	0.038 (4)	M1+E2	12.2 (4)	0.0029 (3)
$\gamma_{8,3}(\text{Pa})$	131.101 (25)	0.0641 (17)	E1	0.262 (5)	0.0508 (13)
$\gamma_{10,6}(\text{Pa})$	134.285 (20)	0.016 (5)	[M1+E2]	8.0 (14)	0.0018 (5)
$\gamma_{10,5}(\text{Pa})$	143.23 (2)	0.088 (15)	M1+E2	6.7 (12)	0.0114 (7)
$\gamma_{-1,3}(\text{Pa})$	147.5	0.0018 (6)			0.0018 (6)
$\gamma_{10,4}(\text{Pa})$	151.409 (20)	0.040 (4)	[M1+E2]	4.9 (6)	0.0067 (3)
$\gamma_{11,6}(\text{Pa})$	153.49 (18)	0.0480 (8)	[E1]	0.180 (4)	0.0407 (7)
$\gamma_{9,2}(\text{Pa})$	155.239 (20)	0.000270 (35)	E1	0.176 (4)	0.00023 (3)
$\gamma_{11,5}(\text{Pa})$	162.504	0.185	[E1]	0.157 (3)	0.16
$\gamma_{7,1}(\text{Pa})$	162.504 (12)	0.194 (3)	[E1]	0.157 (3)	0.1674 (26)
$\gamma_{7,0}(\text{Pa})$	169.162 (10)	0.287 (5)	[E1]	0.1431 (29)	0.251 (4)
$\gamma_{11,4}(\text{Pa})$	170.60 (6)	0.578 (10)	[E1]	0.1403 (28)	0.507 (9)
$\gamma_{17,15}(\text{Pa})$	179.05 (8)	0.125 (25)	(M1+E2)	3.5 (8)	0.0278 (7)
$\gamma_{10,2}(\text{Pa})$	180.76 (3)	0.000123 (3)	[E1]	0.1223 (24)	0.00011 (3)
$\gamma_{11,3}(\text{Pa})$	186.80 (18)	0.067 (27)	[M1+E2]	2.2 (13)	0.0209 (9)
$\gamma_{12,11}(\text{Pa})$	190.552 (14)	0.367 (8)	M1	3.26 (6)	0.0861 (15)
$\gamma_{8,1}(\text{Pa})$	194.97 (7)	0.1183 (19)	E1	0.1024 (20)	0.1073 (17)
$\gamma_{8,0}(\text{Pa})$	201.62 (5)	0.0242 (9)	E1	0.0946 (19)	0.0221 (8)
$\gamma_{17,14}(\text{Pa})$	210.67 (8)	0.044 (18)	[M1+E2]	1.5 (10)	0.0178 (11)
$\gamma_{-1,4}(\text{Pa})$	211.3 (2)	0.0202 (9)			0.0202 (9)
$\gamma_{9,0}(\text{Pa})$	212.34 (5)	0.0070 (7)	E1	0.0839 (17)	0.0065 (6)
$\gamma_{13,10}(\text{Pa})$	216.54 (8)	0.031 (12)	(M1+E2)	1.4 (9)	0.0130 (7)
$\gamma_{18,15}(\text{Pa})$	226.1 (2)	0.0516 (22)	M1+(E2)	2.02 (4)	0.0171 (7)
$\gamma_{10,0}(\text{Pa})$	237.86 (6)	0.00202 (43)	[E1]	0.0645 (13)	0.0019 (4)
$\gamma_{-1,5}(\text{Pa})$	242.3	0.0029 (6)			0.0029 (6)
$\gamma_{12,8}(\text{Pa})$	246.14 (6)	0.0043 (6)	[E1]	0.0596 (12)	0.0041 (6)
$\gamma_{11,1}(\text{Pa})$	250.65 (16)	0.0062 (4)	[E2]	0.317 (6)	0.0047 (3)
$\gamma_{13,8}(\text{Pa})$	252.78 (9)	0.0152 (21)	[M1+E2]	1.3 (3)	0.0066 (3)
$\gamma_{11,0}(\text{Pa})$	257.30 (15)	0.09 (3)	[M1+E2]	0.8 (6)	0.0524 (12)
$\gamma_{12,7}(\text{Pa})$	278.7 (4)	0.0047 (6)			0.0047 (6)
$\gamma_{13,7}(\text{Pa})$	285.24 (7)	0.030 (4)	[M1+E2]	0.94 (22)	0.0154 (9)
$\gamma_{-1,6}(\text{Pa})$	309.9	0.0032 (3)			0.0032 (3)
$\gamma_{14,10}(\text{Pa})$	316.1	0.00383 (41)	E1	0.0340 (7)	0.0037 (4)
$\gamma_{15,10}(\text{Pa})$	347.64 (6)	0.0234 (13)	[M1]	0.613 (12)	0.0145 (8)
$\gamma_{13,5}(\text{Pa})$	359.74 (4)	0.1355 (21)	M1	0.559 (11)	0.0869 (12)
$\gamma_{12,4}(\text{Pa})$	361.285 (22)	0.0224 (6)	[E1]	0.0255 (5)	0.0218 (6)
$\gamma_{13,4}(\text{Pa})$	367.92 (7)	0.0056 (11)	[M1]	0.525 (10)	0.0037 (7)
$\gamma_{12,3}(\text{Pa})$	377.27 (11)	0.040 (3)	[M1+E2]	0.46 (8)	0.0275 (9)
$\gamma_{-1,7}(\text{Pa})$	383.5	0.0019 (6)			0.0019 (6)
$\gamma_{19,15}(\text{Pa})$	398.8 (5)	0.0158 (10)	[M1]	0.422 (8)	0.0111 (7)
$\gamma_{-1,8}(\text{Pa})$	408.8 (5)	0.0005 (4)			0.0005 (4)
$\gamma_{16,11}(\text{Pa})$	412.5 (5)	0.0115 (10)	[M1]	0.385 (8)	0.0083 (7)
$\gamma_{-1,9}(\text{Pa})$	418.4 (5)	0.0091 (7)			0.0091 (7)
$\gamma_{19,14}(\text{Pa})$	430.9 (4)	0.0239 (5)	(M1)	0.342 (6)	0.0178 (4)
$\gamma_{20,15}(\text{Pa})$	433.2 (4)	0.0117 (4)			0.0117 (4)



	Energy keV	$P_{\gamma+ce}$ $\times 100$	Multipolarity	$\alpha_T$	$P_\gamma$ $\times 100$
$\gamma_{12,1}(\text{Pa})$	440.94 (4)	0.249 (10)	(M1+E2)	0.30 (5)	0.1912 (23)
$\gamma_{12,0}(\text{Pa})$	447.762 (20)	0.134 (5)	[M1+E2]	0.29 (4)	0.1043 (14)
$\gamma_{-1,10}(\text{Pa})$	454.2 (5)	0.04			0.04
$\gamma_{14,5}(\text{Pa})$	459.222 (7)	1.274 (17)	M1	0.288 (6)	0.989 (12)
$\gamma_{-1,11}(\text{Pa})$	464.8	0.0026 (3)			0.0026 (3)
$\gamma_{14,4}(\text{Pa})$	467.40 (6)	0.0167 (17)	[M1,E2]	0.16 (11)	0.0144 (4)
$\gamma_{-1,12}(\text{Pa})$	473.9 (5)	0.0033 (7)			0.0033 (7)
$\gamma_{15,5}(\text{Pa})$	490.80 (6)	0.1338 (21)	M1	0.241 (5)	0.1078 (16)
$\gamma_{-1,13}(\text{Pa})$	497.1 (4)	0.0128 (4)			0.0128 (4)
$\gamma_{15,4}(\text{Pa})$	499.02 (4)	0.1938 (27)	M1	0.230 (5)	0.1576 (21)
$\gamma_{-1,14}(\text{Pa})$	505.5 (6)	0.0055 (3)			0.0055 (3)
$\gamma_{-1,15}(\text{Pa})$	513.4 (4)	0.0133 (4)			0.0133 (4)
$\gamma_{-1,16}(\text{Pa})$	517.0 (4)	0.0046 (3)			0.0046 (3)
$\gamma_{17,10}(\text{Pa})$	526.69 (6)	0.052 (4)	[M1,E2]	0.12 (8)	0.0463 (11)
$\gamma_{-1,17}(\text{Pa})$	531.8 (4)	0.0070 (7)			0.0070 (7)
$\gamma_{17,9}(\text{Pa})$	552.21 (8)	0.0194 (6)	(M1)	0.1754 (35)	0.0165 (5)
$\gamma_{-1,18}(\text{Pa})$	553.7	0.0030 (3)			0.0030 (3)
$\gamma_{-1,19}(\text{Pa})$	554.9	0.0031 (3)			0.0031 (3)
$\gamma_{17,8}(\text{Pa})$	562.93 (8)	0.0636 (8)	[M1]	0.167 (3)	0.0545 (7)
$\gamma_{18,10}(\text{Pa})$	573.7 (4)	0.0384 (12)	[M1]	0.158 (3)	0.0332 (10)
$\gamma_{-1,20}(\text{Pa})$	578.7	0.0017 (5)			0.0017 (5)
$\gamma_{-1,21}(\text{Pa})$	583.2	0.0016 (5)			0.0016 (5)
$\gamma_{17,7}(\text{Pa})$	595.39 (6)	0.1346 (19)	(M1)	0.143 (3)	0.1178 (16)
$\gamma_{18,9}(\text{Pa})$	599.3 (2)	0.0335 (6)	[M1]	0.141 (3)	0.0294 (5)
$\gamma_{18,8}(\text{Pa})$	610.0 (3)	0.0643 (14)	[M1]	0.134 (3)	0.0567 (12)
$\gamma_{18,7}(\text{Pa})$	642.4 (2)	0.0226 (6)	[M1]	0.1171 (23)	0.0202 (5)
$\gamma_{16,1}(\text{Pa})$	663.3 (5)	0.0041 (6)	[M1]	0.1075 (22)	0.0037 (5)
$\gamma_{16,0}(\text{Pa})$	669.9 (5)	0.0018			0.0018
$\gamma_{17,5}(\text{Pa})$	669.901 (16)	0.557 (7)	[M1]	0.1047 (21)	0.504 (6)
$\gamma_{17,4}(\text{Pa})$	678.04 (10)	0.0686 (28)	[M1,E2]	0.06 (4)	0.0647 (9)
$\gamma_{-1,22}(\text{Pa})$	681.2 (6)	0.0143 (4)			0.0143 (4)
$\gamma_{-1,23}(\text{Pa})$	690	0.0021 (5)			0.0021 (5)
$\gamma_{-1,24}(\text{Pa})$	698.5 (6)	0.0106 (5)			0.0106 (5)
$\gamma_{-1,25}(\text{Pa})$	703.7 (6)	0.0091 (5)			0.0091 (5)
$\gamma_{18,6}(\text{Pa})$	707.8 (3)	0.0093 (5)	[E2]	0.0209 (4)	0.0091 (5)
$\gamma_{18,5}(\text{Pa})$	717.0 (2)	0.0458 (10)	(M1)	0.0874 (17)	0.0421 (9)
$\gamma_{18,4}(\text{Pa})$	725.1 (2)	0.0687 (11)	(M1)	0.0848 (17)	0.0633 (10)
$\gamma_{-1,26}(\text{Pa})$	727.8	0.0029 (2)			0.0029 (2)
$\gamma_{18,3}(\text{Pa})$	741.1 (2)	0.0237 (5)	[E1]	0.00615 (12)	0.0236 (5)
$\gamma_{-1,27}(\text{Pa})$	744.9 (5)	0.0053 (2)			0.0053 (2)
$\gamma_{-1,28}(\text{Pa})$	751.6 (6)	0.0023 (4)			0.0023 (4)
$\gamma_{17,1}(\text{Pa})$	757.90 (7)	0.0324 (7)			0.0324 (7)
$\gamma_{17,0}(\text{Pa})$	764.55 (6)	0.0891 (13)			0.0891 (13)
$\gamma_{-1,29}(\text{Pa})$	767.5	0.0032 (2)			0.0032 (2)
$\gamma_{-1,30}(\text{Pa})$	774.0 (4)	0.0108 (5)			0.0108 (5)
$\gamma_{19,8}(\text{Pa})$	783.2 (5)	0.00600 (32)	[M1]	0.0692 (14)	0.0056 (3)
$\gamma_{-1,31}(\text{Pa})$	784.2 (5)	0.0022 (2)			0.0022 (2)
$\gamma_{18,1}(\text{Pa})$	805.0 (2)	0.0215 (6)	[E1]	0.00529 (11)	0.0214 (6)

	Energy keV	$P_{\gamma+ce}$ $\times 100$	Multipolarity	$\alpha_T$	$P_\gamma$ $\times 100$
$\gamma_{20,9}(\text{Pa})$	806.4 (5)	0.0123 (5)			0.0123 (5)
$\gamma_{18,0}(\text{Pa})$	811.6 (2)	0.0060 (2)	[E1]	0.00521 (10)	0.0060 (2)
$\gamma_{19,7}(\text{Pa})$	815.9 (4)	0.0207 (6)	[M1]	0.0621 (12)	0.0195 (6)
$\gamma_{20,8}(\text{Pa})$	817.0 (6)	0.0095 (5)			0.0095 (5)
$\gamma_{-1,32}(\text{Pa})$	832.0 (3)	0.0075			0.0075
$\gamma_{-1,33}(\text{Pa})$	846.8 (7)	0.0013			0.0013
$\gamma_{20,7}(\text{Pa})$	849.5 (5)	0.0039 (3)			0.0039 (3)
$\gamma_{-1,34}(\text{Pa})$	870.7 (7)	0.0031 (2)			0.0031 (2)
$\gamma_{-1,35}(\text{Pa})$	874.0 (5)	0.00120 (4)			0.00120 (4)
$\gamma_{19,6}(\text{Pa})$	880.9 (5)	0.0098 (4)	E2	0.0135 (3)	0.0097 (4)
$\gamma_{19,5}(\text{Pa})$	890.1 (5)	0.1104 (15)	[M1]	0.0493 (10)	0.1052 (14)
$\gamma_{19,4}(\text{Pa})$	898.3 (5)	0.0023 (4)	[M1]	0.0481 (10)	0.0022 (4)
$\gamma_{-1,36}(\text{Pa})$	918.9 (5)	0.006			0.006
$\gamma_{-1,37}(\text{Pa})$	935.2 (7)	0.0369 (7)			0.0369 (7)
$\gamma_{-1,38}(\text{Pa})$	941.9 (8)	0.0048 (3)			0.0048 (3)
$\gamma_{-1,39}(\text{Pa})$	942.8	0.0019 (3)			0.0019 (3)
$\gamma_{20,3}(\text{Pa})$	948.3 (5)	0.0060 (3)			0.0060 (3)
$\gamma_{-1,40}(\text{Pa})$	955 (1)	0.0002 (3)			0.0002 (3)
$\gamma_{-1,41}(\text{Pa})$	960.8 (8)	0.0041 (2)			0.0041 (2)
$\gamma_{-1,42}(\text{Pa})$	962.8 (9)	0.0015 (2)			0.0015 (2)
$\gamma_{-1,43}(\text{Pa})$	968.2 (9)	0.0083 (3)			0.0083 (3)
$\gamma_{19,1}(\text{Pa})$	978.2 (5)	0.00582 (30)	[E1]	0.00374 (7)	0.0058 (3)
$\gamma_{19,0}(\text{Pa})$	984.8 (5)	0.01024 (30)	[E1]	0.00369 (7)	0.0102 (3)
$\gamma_{-1,44}(\text{Pa})$	994 (1)	0.0006 (1)			0.0006 (1)
$\gamma_{-1,45}(\text{Pa})$	1001 (1)	0.0008 (2)			0.0008 (2)
$\gamma_{-1,46}(\text{Pa})$	1007 (1)	0.0014 (2)			0.0014 (2)
$\gamma_{-1,47}(\text{Pa})$	1011 (1)	0.0019 (2)			0.0019 (2)
$\gamma_{-1,48}(\text{Pa})$	1026.5 (10)	0.0075			0.0075
$\gamma_{-1,49}(\text{Pa})$	1092.5 (10)	0.006			0.006
$\gamma_{-1,50}(\text{Pa})$	1132.1	0.0006 (2)			0.0006 (2)
$\gamma_{-1,51}(\text{Pa})$	1139.1	0.0004 (1)			0.0004 (1)
$\gamma_{-1,52}(\text{Pa})$	1144 (1)	0.0027			0.0027
$\gamma_{-1,53}(\text{Pa})$	1201 (1)	0.006			0.006

## 5 References

- W.C.RUTLEDGE, J.M.CORK, S.B.BURSON, Phys. Rev. 86 (1952) 775  
(Half-life)
- E.N.JENKINS, Analyst 80 (1955) 301  
(Half-life)
- M.S.FREEDMAN, D.W.ENGLKEMEIR, F.T.PORTER, F.WAGNER JR., P.DAY, Priv. Comm. (1957)  
(Gamma-ray emission probabilities, beta-transition energies)
- B.J.DROPESKY, L.M.LANGER, Phys. Rev. 108 (1957) 90  
(Half-life, energy of beta(0,0)-transition)
- R.DAMS, F.ADAMS, Radiochim. Acta 10 (1968) 1  
(Gamma-ray energies)
- E.BROWNE, F.ASARO, Report UCRL-17989, Univ. California (1968) 1  
(Gamma-ray energies)
- J.M.VARA, R.GAETA, Nucl. Phys. A130 (1969) 586  
(Gamma-ray energies)

- W.HOEKSTRA, Thesis, Technische Hogeschool, Delft. (1969)  
(Half-life, KX-ray emission probabilities, gamma - ray relative probabilities)
- C.SEBILLE, G.BASTIN, C.F.LEANG, R.PIEPENBRING, M.F.PERRIN, Compt. Rend. Acad. Sci. (Paris) Ser. A 270 (1970) 354  
(Gamma-ray energies)
- C.SEBILLE-SCHUCK, Thesis, Report FRNC-TH-255, Univ. Paris (1972)  
(Gamma-ray relative probabilities, gamma-ray multipolarities, conversion electron characteristics)
- M.DE BRUIN, P.J.M.KORTHOVEN, J. Radioanal. Chem. 10 (1972) 125  
(Gamma-ray energies)
- T.VON EGIDY, O.W.B.SCHULT, D.RABENSTEIN, J.R.ERSKINE, O.A.WASSON, R.E.CHRIEN, D.BREITIG, R.P.SHARMA, H.A.BAADER, H.R.KOCH, Phys. Rev. C6 (1972) 266  
(Gamma-ray energies)
- M.SKALSEY, R.D.CONNOR, Can. J. Phys. 54 (1976) 1409  
(Gamma-ray energies)
- P.JEUCH, Thesis, Tech. Univ. Munchen (1976)  
(Gamma-ray multipolarities, conversion electron characteristics)
- L.GONZALEZ, R.GAETA, E.VANO, J.M.LOS ARCOS, Nucl. Phys. A324 (1979) 126  
(Gamma-ray energies)
- H.G.BORNER, G.BARREAU, W.F.DAVIDSON, P.JEUCH, T.VON EGIDY, J.ALMEIDA, D.H.WHITE, Nucl. Instrum. Methods 166 (1979) 251  
(Gamma-ray energies)
- S.A.WOODS, P.CHRISTMAS, P.CROSS, S.M.JUDGE, W.GELLETLY, Nucl. Instrum. Methods Phys. Res. A264 (1988) 333  
(Gamma-ray energies, ICC for gamma (4,0))
- A.ABZOUZI, M.S.ANTONY, V.B.NDOCKO NDONGUE, J. Radioanal. Nucl. Chem. 135 (1989) 1  
(Half-life)
- K.USMAN, T.D.MCMAHON, S.I.KAFALA, Appl. Radiat. Isot. 49 (1998) 1329  
(Half-life)
- M.-M.BÉ, R.HELMER, V.CHISTÉ, J. Nucl. Sci. Technol. (Tokyo) suppl.2 (2002) 481  
(SAISINUC software)
- G.AUDI, A.H.WAPSTRA, C.THIBAUT, Nucl. Phys. A729 (2003) 337  
(Q)
- B.SINGH, J.K.TULI, Nucl. Data Sheets 105 (2005) 109  
(Decay data evaluations, multipolarities, decay scheme, Pa233 level energies, multipolarities)
- D.J.DEVRIES, H.C.GRIFFIN, Appl. Radiat. Isot. 66 (2008) 1999  
(Uncertainties of LX-ray absolute emission probabilities)
- V.M.GOROZHANKIN, M.-M.BE, Appl. Radiat. Isot. 66 (2008) 722  
(ICC for anomalous E1 gamma-ray transitions)
- T.KIBÉDI, T.W.BURROWS, M.B.TRZHASKOVSKAYA, P.M.DAVIDSON, C.W.NESTOR JR., Nucl. Instrum. Methods Phys. Res. A589 (2008) 202  
(Theoretical ICC)
- D.J.DEVRIES, H.C.GRIFFIN, Appl. Radiat. Isot. 66 (2008) 1999  
(Absolute and relative gamma-ray and X-ray emission probabilities)