$^{212}_{83}$Bi$_{129}$

1 Decay Scheme

Bi-212 undergoes β^- decay to Po-212 (64.07(7)%), and α decay to Tl-208 (35.93(7)%).
Le bismuth 212 se désintègre à 64,07(7)% par émission β^- vers le polonium 212 et à 35,93(7)% par émission α vers le thallium 208.

2 Nuclear Data

$T_{1/2}(^{212}\mathrm{Bi})$	:	60,54	(6)	min
$T_{1/2}(^{212}\mathrm{Po})$	:	300	(2)	10^{-9} s
$T_{1/2}(^{208}\mathrm{Tl})$	:	3,060	(8)	min
$Q^-(^{212}\mathrm{Bi})$	:	2254	(2)	keV
$Q^\alpha(^{212}\mathrm{Bi})$	:	6207,14	(4)	keV

2.1 α Transitions

	Energy keV	Probability × 100	F
$\alpha_{0,7}$	5400 (1)	0,000039 (4)	20800
$\alpha_{0,6}$	5448 (1)	0,00036 (18)	3810
$\alpha_{0,5}$	5586,7 (3)	0,0050 (7)	1370
$\alpha_{0,4}$	5714,45 (14)	0,43 (4)	66,9
$\alpha_{0,3}$	5733,6 (2)	0,06 (1)	594
$\alpha_{0,2}$	5879,2 (1)	0,63 (3)	269
$\alpha_{0,1}$	6167,28 (4)	25,1 (1)	126
$\alpha_{0,0}$	6207,14 (4)	9,7 (1)	480
$^*\alpha_{1,0}$	9681,46 (12)	0,0024 (2)	
$^*\alpha_{4,0}$	10633,58 (13)	0,0010 (1)	
$^*\alpha_{5,0}$	10755,0 (3)	0,0106 (8)	

* Transitions α of long range.

2.2 β^- Transitions

	Energy keV	Probability × 100	Nature	lg ft
$\beta^-_{0,6}$	448 (2)	0,68 (5)	1st Forbidden non-unique	6,69
$\beta^-_{0,5}$	453 (2)	0,029 (1)	1st Forbidden non-unique	8,08
$\beta^-_{0,4}$	575 (2)	0,21 (5)	1st Forbidden non-unique	7,56
$\beta^-_{0,3}$	633 (2)	1,90 (4)	1st Forbidden non-unique	6,74
$\beta^-_{0,2}$	741 (2)	1,45 (2)	1st Forbidden non-unique	7,1
$\beta^-_{0,1}$	1527 (2)	4,58 (21)	1st Forbidden non-unique	7,71
$\beta^-_{0,0}$	2254 (2)	55,23 (21)	1st Forbidden non-unique	7,269

2.3 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M+	α_T
$\gamma_{1,0}$(Tl)	39,858 (4)	26 (1)	[M1]		18,6 (5)	6,00 (18)	24,6 (7)
$\gamma_{5,3}$(Po)	180,2 (2)	0,010 (3)	M1	1,79 (5)	0,32 (1)	0,100 (3)	2,21 (7)
$\gamma_{2,1}$(Tl)	288,08 (6)	0,47 (3)	[M1+E2]	0,378 (11)	0,064 (2)	0,0190 (6)	0,461 (14)
$\gamma_{2,0}$(Tl)	327,94 (6)	0,160 (4)	[M1]	0,267 (8)	0,0450 (13)	0,0130 (4)	0,325 (10)
$\gamma_{3,1}$(Tl)	433,7 (2)	0,011 (2)	[M1]	0,126 (4)	0,0210 (6)	0,0060 (2)	0,153 (5)
$\gamma_{4,1}$(Tl)	452,8 (1)	0,39 (3)	[M1]	0,112 (3)	0,0190 (6)	0,0060 (2)	0,137 (4)
$\gamma_{3,0}$(Tl)	473,6 (2)	0,049 (3)	[M1]	0,100 (3)	0,0160 (5)	0,00500 (15)	0,121 (4)
$\gamma_{4,0}$(Tl)	492,7 (1)	0,04 (1)	[M1]	0,090 (3)	0,0150 (5)	0,00400 (12)	0,109 (3)
$\gamma_{5,1}$(Tl)	580,5 (3)	0,0010 (2)	[E2]	0,0148 (5)	0,0039 (1)	0,00130 (4)	0,0200 (6)
$\gamma_{5,0}$(Tl)	620,4 (3)	0,0040 (6)	[M1]	0,0492 (15)	0,0081 (2)	0,00250 (8)	0,0598 (18)
$\gamma_{1,0}$(Po)	727,33 (1)	6,84 (12)	E2	0,0106 (3)	0,00260 (8)	0,00090 (3)	0,0141 (4)
$\gamma_{6,0}$(Tl)	759 (1)	0,00036 (18)					
$\gamma_{2,1}$(Po)	785,37 (9)	1,16 (1)	[M1+E2]	0,0338 (10)	0,0057 (2)	0,00180 (5)	0,0413 (12)
$\gamma_{7,0}$(Tl)	807 (1)	0,000039 (4)					
$\gamma_{3,1}$(Po)	893,41 (2)	0,39 (1)	[M1+E2]	0,0243 (7)	0,0041 (1)	0,00130 (4)	0,0297 (9)
$\gamma_{4,1}$(Po)	952,12 (2)	0,14 (4)	[M1+E2]	0,0164 (5)	0,00280 (8)	0,00100 (3)	0,0202 (6)
$\gamma_{5,1}$(Po)	1073,6 (2)	0,015 (5)	E2	0,00516 (15)	0,00100 (3)	0,00033 (1)	0,00649 (20)
$\gamma_{6,1}$(Po)	1078,63 (11)	0,56 (2)	[M1+E2]	0,0149 (4)	0,00230 (7)	0,00090 (3)	0,0181 (5)
$\gamma_{2,0}$(Po)	1512,70 (8)	0,29 (1)	E2	0,00278 (8)	0,00048 (2)	0,000160 (5)	0,00342 (10)
$\gamma_{3,0}$(Po)	1620,74 (1)	1,52 (3)	[M1+E2]	0,00504 (15)	0,00078 (2)	0,000030 (1)	0,00585 (18)
$\gamma_{4,0}$(Po)	1679,45 (1)	0,07 (1)	E2	0,00230 (7)	0,00039 (1)	0,000130 (4)	0,00282 (8)
$\gamma_{5,0}$(Po)	1800,9 (2)	0,004 (2)	E0				
$\gamma_{6,0}$(Po)	1805,96 (10)	0,12 (3)	E2	0,00202 (6)	0,00034 (1)	0,000110 (3)	0,00247 (7)

3 Atomic Data

3.1 Po

ω_K	:	0,965	(4)
$\bar{\omega}_L$	:	0,403	(16)
n_{KL}	:	0,807	(5)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	76,864		60,1
	$K\alpha_1$	79,293		100
	$K\beta_3$	89,256	}	
	$K\beta_1$	89,63	}	
	$K\beta_5''$	90,363	}	34,4
	$K\beta_2$	92,45	}	
	$K\beta_4$	92,62	}	10,7
	$KO_{2,3}$	92,98	}	
X_L				
	$L\ell$	9,66		
	$L\alpha$	11,016 – 11,13		
	$L\eta$	12,085		
	$L\beta$	12,823 – 13,778		
	$L\gamma$	15,742 – 16,21		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	58,98 – 65,21	100
KLX	71,90 – 79,29	57
KXY	84,8 – 93,1	8,1
Auger L	5,43 – 10,93	3190

3.2 Tl

ω_K	:	0,963	(4)
$\bar{\omega}_L$	:	0,367	(15)
n_{KL}	:	0,812	(5)

3.2.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	70,833		59
	$K\alpha_1$	72,873		100
	$K\beta_3$	82,118	}	
	$K\beta_1$	82,43	}	
	$K\beta_5''$	83,115	}	34
	$K\beta_2$	84,838	}	
	$K\beta_4$	85,134	}	10,1
	$KO_{2,3}$	85,444	}	
X_L				
	$L\ell$	8,953		
	$L\alpha$	10,172 – 10,268		
	$L\eta$	10,994		
	$L\beta$	11,812 – 12,643		
	$L\gamma$	14,291 – 14,738		

3.2.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	54,59 – 59,95	100
KLX	66,37 – 72,86	55
KXY	78,12 – 85,50	7,6
Auger L	5,18 – 10,13	363000

4 α Emissions

	Energy keV	Probability × 100
$\alpha_{0,7}$	5298 (1)	0,000039 (4)
$\alpha_{0,6}$	5345 (1)	0,00036 (18)
$\alpha_{0,5}$	5481,3 (3)	0,0050 (7)
$\alpha_{0,4}$	5606,63 (14)	0,43 (4)
$\alpha_{0,3}$	5625,4 (2)	0,06 (1)
$\alpha_{0,2}$	5768,27 (10)	0,63 (3)
$\alpha_{0,1}$	6050,92 (4)	25,1 (1)
$\alpha_{0,0}$	6090,02 (4)	9,7 (1)
$^{*}\alpha_{1,0}$	9498,79 (12)	0,0024 (2)
$^{*}\alpha_{4,0}$	10432,95 (13)	0,0010 (1)
$^{*}\alpha_{5,0}$	10552,1 (3)	0,0106 (8)

* α of long range.

5 Electron Emissions

		Energy keV		Electrons per 100 disint.
e_{AL}	(Po)	5,43 - 10,93		0,0958 (16)
e_{AK}	(Po)			0,0050 (6)
	KLL	58,98 - 65,21	}	
	KLX	71,90 - 79,29	}	
	KXY	84,8 - 93,1	}	
e_{AL}	(Tl)	5,18 - 10,13		16,7 (7)
e_{AK}	(Tl)			0,0074 (9)
	KLL	54,59 - 59,95	}	
	KLX	66,37 - 72,86	}	
	KXY	78,12 - 85,50	}	
$ec_{1,0\ L}$	(Tl)	24,51 - 27,20		19 (1)
$ec_{1,0\ M}$	(Tl)	36,15 - 39,85		6,1 (2)
$\beta^-_{0,6}$	max:	448	(2)	0,68 (5)
$\beta^-_{0,6}$	avg:	130,7	(7)	
$\beta^-_{0,5}$	max:	453	(2)	0,029 (1)
$\beta^-_{0,5}$	avg:	132,3	(7)	
$\beta^-_{0,4}$	max:	575	(2)	0,21 (5)
$\beta^-_{0,4}$	avg:	173,0	(7)	

		Energy keV		Electrons per 100 disint.
$\beta^-_{0,3}$	max:	633	(2)	1,90 (4)
$\beta^-_{0,3}$	avg:	193,3	(7)	
$\beta^-_{0,2}$	max:	741	(2)	1,45 (2)
$\beta^-_{0,2}$	avg:	231,5	(8)	
$\beta^-_{0,1}$	max:	1527	(2)	4,58 (21)
$\beta^-_{0,1}$	avg:	533,9	(8)	
$\beta^-_{0,0}$	max:	2254	(2)	55,23 (21)
$\beta^-_{0,0}$	avg:	835,0	(9)	

6 Photon Emissions

6.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Po)	9,66 — 16,21		0,0581 (12)	
XKα_2	(Po)	76,864		0,0404 (10)	} Kα
XKα_1	(Po)	79,293		0,0672 (17)	}
XKβ_3	(Po)	89,256	}		
XKβ_1	(Po)	89,63	}	0,0231 (7)	K$'\beta_1$
XKβ''_5	(Po)	90,363	}		
XKβ_2	(Po)	92,45	}		
XKβ_4	(Po)	92,62	}	0,00720 (24)	K$'\beta_2$
XKO$_{2,3}$	(Po)	92,98	}		
XL	(Tl)	8,953 — 14,738		6,73 (22)	
XKα_2	(Tl)	70,833		0,0563 (27)	} Kα
XKα_1	(Tl)	72,873		0,095 (5)	}
XKβ_3	(Tl)	82,118	}		
XKβ_1	(Tl)	82,43	}	0,0323 (16)	K$'\beta_1$
XKβ''_5	(Tl)	83,115	}		
XKβ_2	(Tl)	84,838	}		
XKβ_4	(Tl)	85,134	}	0,0096 (5)	K$'\beta_2$
XKO$_{2,3}$	(Tl)	85,444	}		

6.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{1,0}$(Tl)	39,858 (4)	1,01 (3)
$\gamma_{5,3}$(Po)	180,2 (2)	0,003 (1)
$\gamma_{2,1}$(Tl)	288,08 (6)	0,32 (2)
$\gamma_{2,0}$(Tl)	327,94 (6)	0,121 (3)
$\gamma_{3,1}$(Tl)	433,7 (2)	0,0095 (20)
$\gamma_{4,1}$(Tl)	452,8 (1)	0,34 (3)
$\gamma_{3,0}$(Tl)	473,6 (2)	0,044 (3)
$\gamma_{4,0}$(Tl)	492,7 (1)	0,04 (1)
$\gamma_{5,1}$(Tl)	580,5 (3)	0,0010 (2)
$\gamma_{5,0}$(Tl)	620,4 (3)	0,0038 (6)
$\gamma_{1,0}$(Po)	727,33 (1)	6,74 (12)
$\gamma_{6,0}$(Tl)	759 (1)	0,00036 (18)
$\gamma_{2,1}$(Po)	785,37 (9)	1,11 (1)
$\gamma_{7,0}$(Tl)	807 (1)	0,000039 (4)
$\gamma_{3,1}$(Po)	893,41 (2)	0,38 (1)
$\gamma_{4,1}$(Po)	952,12 (2)	0,14 (4)
$\gamma_{5,1}$(Po)	1073,6 (2)	0,015 (5)
$\gamma_{6,1}$(Po)	1078,63 (11)	0,55 (2)
$\gamma_{2,0}$(Po)	1512,70 (8)	0,29 (1)
$\gamma_{3,0}$(Po)	1620,74 (1)	1,51 (3)
$\gamma_{4,0}$(Po)	1679,45 (1)	0,07 (1)
$\gamma_{5,0}$(Po)	1800,9 (2)	0,004 (2)
$\gamma_{6,0}$(Po)	1805,96 (10)	0,12 (3)

7 Main Production Modes

Pb – 212 β^- decay

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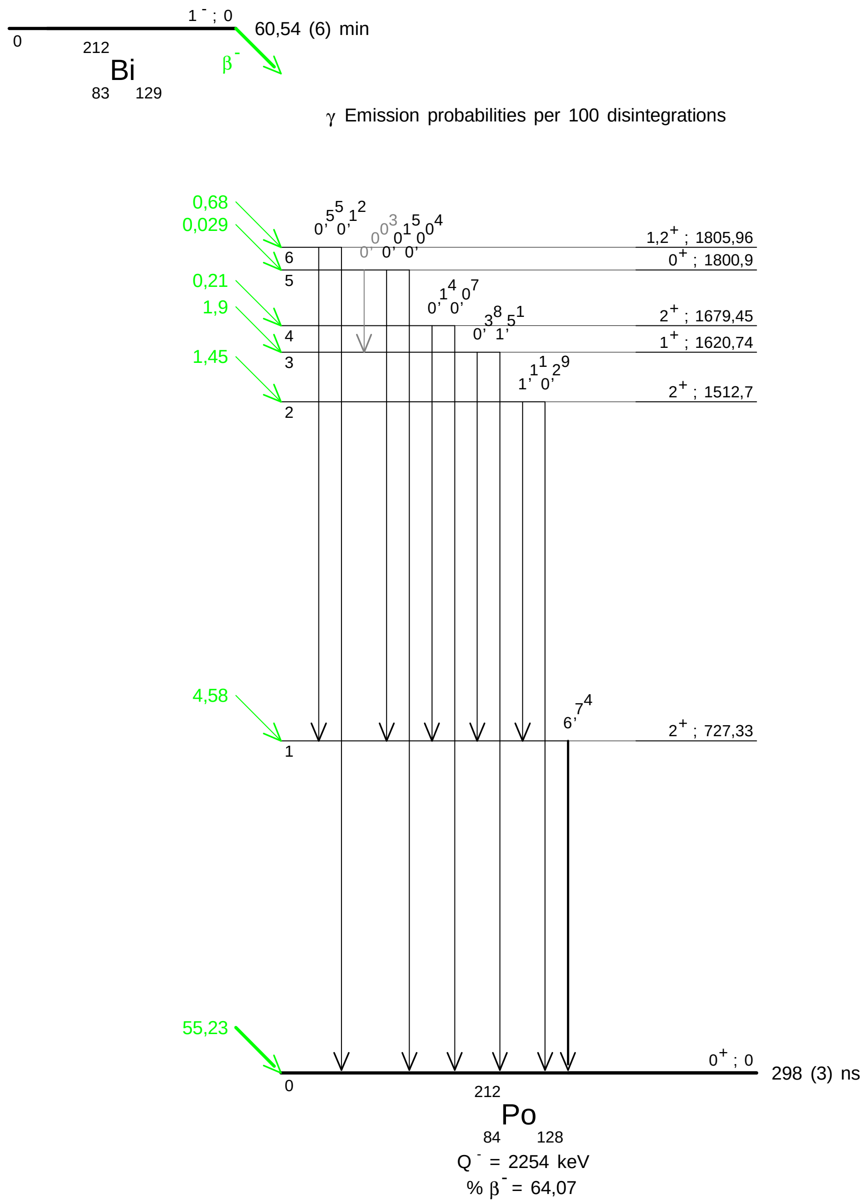
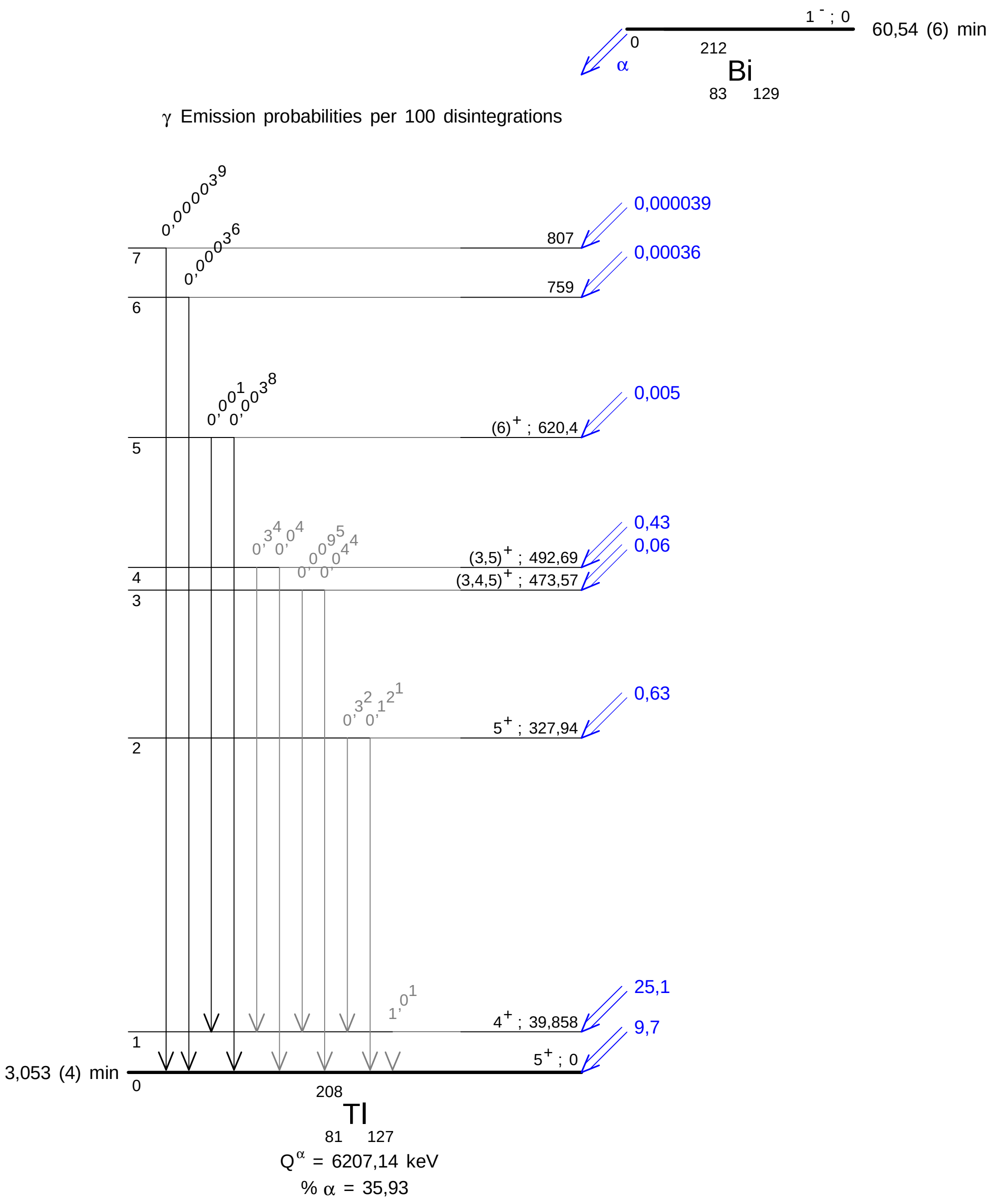

1 - ; 0
60,54 (6) min
0
212
Bi
83 129
β -
γ Emission probabilities per 100 disintegrations
0,68
0,029
0,21
1,9
1,45
4,58
55,23
6
5
4
3
2
1
0
1,2+ ; 1805,96
0+ ; 1800,9
2+ ; 1679,45
1+ ; 1620,74
2+ ; 1512,7
2+ ; 727,33
0+ ; 0
298 (3) ns
212
Po
84 128
Q - = 2254 keV
% β- = 64,07


1 - ; 0
60,54 (6) min
α
212
Bi
83 129
γ Emission probabilities per 100 disintegrations
0,000039
0,00036
0,005
0,43
0,06
0,63
25,1
9,7
807
759
(6)+ ; 620,4
(3,5)+ ; 492,69
(3,4,5)+ ; 473,57
5+ ; 327,94
4+ ; 39,858
5+ ; 0
3,053 (4) min
208
Tl
81 127
Qα = 6207,14 keV
% α = 35,93