$^{204}_{81}\mathrm{Tl}_{123}$

1 Decay Scheme

Le Tl-204 se désintègre par capture électronique (2,92 %) vers le niveau fondamental de Hg-204 et par émission bêta moins (97,08 %) vers le niveau fondamental de Pb-204.
Tl-204 disintegrates 97.08 (13)% by beta minus emission and 2.92 (13)% by electron capture transition to the ground states of Pb-204 and Hg-204, respectively.

2 Nuclear Data

$T_{1/2}(^{204}\mathrm{Tl})$	:	3,788	(15)	a
$Q^-(^{204}\mathrm{Tl})$	:	763,72	(18)	keV
$Q^+(^{204}\mathrm{Tl})$	:	345,0	(13)	keV

2.1 β^- Transitions

	Energy keV	Probability × 100	Nature	lg ft
$\beta^-_{0,0}$	763,7 (2)	97,08 (13)	Unique 1st Forbidden	10,1

2.2 Electron Capture Transitions

	Energy keV	Probability × 100	Nature	lg ft	P_K	P_L	P_{M+}
$\epsilon_{0,0}$	347,5 (15)	2,92 (13)	Unique 1st Forbidden	9,6	0,5843 (14)	0,3024 (10)	0,1133 (5)

3 Atomic Data

3.1 Hg

ω_K	:	0,962	(4)
$\bar{\omega}_L$	:	0,355	(14)
$\bar{\omega}_M$	:	0,026	(3)
n_{KL}	:	0,815	(4)
$\bar{n}_{LM}$	:	1,34	(4)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	68,895		58,99
	$K\alpha_1$	70,82		100
	$K\beta_3$	79,823	}	
	$K\beta_1$	80,254	}	
	$K\beta_5''$	80,762	}	34,3
	$K\beta_2$	82,435	}	
	$K\beta_4$	82,776	}	10,04
	$KO_{2,3}$	83,028	}	
X_L				
	$L\ell$	8,721		
	$L\alpha$	9,898 – 9,989		
	$L\eta$	10,647		
	$L\beta$	11,924 – 11,822		
	$L\gamma$	– 14,847		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	53,17 – 58,28	100
KLX	64,59 – 70,81	55,2
KXY	75,92 – 83,08	7,62
Auger L	5,1 – 14,8	

3.2 Pb

ω_K : 0,963 (4)
$\bar{\omega}_L$: 0,379 (15)
n_{KL} : 0,811 (5)

3.2.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	72,8049		59,5
	$K\alpha_1$	74,97		100
	$K\beta_3$	84,451	}	
	$K\beta_1$	84,937	}	
	$K\beta_5''$	85,47	}	34,2
	$K\beta_2$	87,238	}	
	$K\beta_4$	87,58	}	10,3
	$KO_{2,3}$	87,911	}	

4 Electron Emissions

		Energy keV		Electrons per 100 disint.
e_{AL}	(Hg)	5,1 - 14,8		1,48 (3)
e_{AK}	(Hg)			0,065 (8)
	KLL	53,17 - 58,28	}	
	KLX	64,59 - 70,81	}	
	KXY	75,92 - 83,08	}	
$\beta^-_{0,0}$	max:	763,7 (2)		97,08 (13)
$\beta^-_{0,0}$	avg:	243,9 (1)		

5 Photon Emissions

5.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Hg)	8,721 — 14,847		0,787 (20)	
XKα_2	(Hg)	68,895		0,474 (20)	} Kα
XKα_1	(Hg)	70,82		0,812 (34)	}
XKβ_3	(Hg)	79,823	}		
XKβ_1	(Hg)	80,254	}	0,273 (10)	K$'\beta_1$
XKβ''_5	(Hg)	80,762	}		
XKβ_2	(Hg)	82,435	}		
XKβ_4	(Hg)	82,776	}	0,081 (3)	K$'\beta_2$
XKO$_{2,3}$	(Hg)	83,028	}		
XKα_2	(Pb)	72,8049		0,0044 (3)	} Kα
XKα_1	(Pb)	74,97		0,0061 (3)	}
XKβ_3	(Pb)	84,451	}		
XKβ_1	(Pb)	84,937	}	0,0027 (2)	K$'\beta_1$
XKβ''_5	(Pb)	85,47	}		
XKβ_2	(Pb)	87,238	}		
XKβ_4	(Pb)	87,58	}	0,00073 (2)	K$'\beta_2$
XKO$_{2,3}$	(Pb)	87,911	}		

6 Main Production Modes

$\mathrm{Tl}-203(\mathrm{n},\gamma)\mathrm{Tl}-204 \qquad \sigma : 11{,}0\ (5)$ barns
Possible impurities : None

7 References

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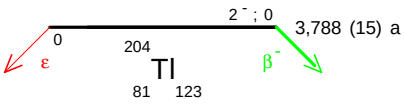
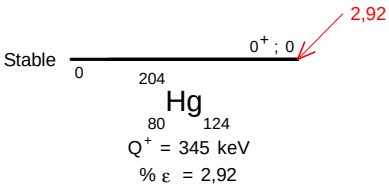
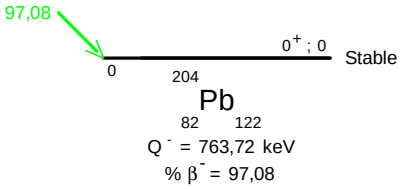
$^{204}_{81}Tl_{123}$


2⁻ ; 0
3,788 (15) a
0
204
Tl
81 123
ε
β⁻


2,92
Stable
0⁺ ; 0
0
204
Hg
80 124
Q⁺ = 345 keV
% ε = 2,92


97,08
0⁺ ; 0
Stable
0
204
Pb
82 122
Q⁻ = 763,72 keV
% β⁻ = 97,08