$^{60}_{27}$Co $_{33}$

1 Decay Scheme

Co-60 disintegrates by beta minus emissions to excited levels of Ni-60.
Le cobalt 60 se désintègre par émission bêta moins vers des niveaux excités de nickel 60.

2 Nuclear Data

$T_{1/2}(^{60}$Co)	:	5,2711	(8)	a
$Q^{-}(^{60}$Co)	:	2823,07	(21)	keV

2.1 β^- Transitions

	Energy keV	Probability × 100	Nature	lg ft
$\beta^-_{0,3}$	317,32 (21)	99,88 (3)	Allowed	7,51
$\beta^-_{0,2}$	664,46 (21)	0,002	Unique 2nd Forbidden	
$\beta^-_{0,1}$	1490,56 (21)	0,12 (3)	Unique 2nd Forbidden	14,7

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K (10^{-4})	α_L (10^{-4})	α_T (10^{-4})	α_π (10^{-5})
$\gamma_{3,2}$(Ni)	347,14 (7)	0,0075 (4)	[E2]	49,9 (15)	5,03 (15)	55,7 (17)	
$\gamma_{2,1}$(Ni)	826,10 (3)	0,0076 (8)	M1+45%E2	3,0 (4)	0,291 (17)	3,4 (4)	
$\gamma_{3,1}$(Ni)	1173,240 (3)	99,85 (3)	E2(+M3)	1,51 (7)	0,148 (4)	1,68 (4)	0,62 (7)
$\gamma_{1,0}$(Ni)	1332,508 (4)	99,9988 (2)	E2	1,15 (5)	0,113 (3)	1,28 (5)	3,4 (4)
$\gamma_{2,0}$(Ni)	2158,61 (3)	0,0012 (2)	E2	0,445 (14)	0,043 (2)	0,495 (15)	
$\gamma_{3,0}$(Ni)	2505,748 (5)	0,0000020 (4)	E4	0,780 (3)	0,076 (3)	0,86 (3)	

3 Atomic Data

3.1 Ni

ω_K	:	0,421	(4)
$\bar{\omega}_L$	:	0,0084	(4)
n_{KL}	:	1,388	(4)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	Kα_2	7,46097		51,24
	Kα_1	7,47824		100
	Kβ_3	8,2647	}	
	Kβ_5''	8,3287	}	20,84
X_L				
	Lℓ	0,74		
	Lγ	– 0,94		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	6,26 – 6,54	100
KLX	7,20 – 7,47	27,6
KXY	8,10 – 8,32	1,9
Auger L	0,7 – 0,9	329

4 Electron Emissions

		Energy keV		Electrons per 100 disint.
e_{AL}	(Ni)	0,7 - 0,9		0,0392 (12)
e_{AK}	(Ni)			0,0154 (5)
	KLL	6,26 - 6,54	}	
	KLX	7,20 - 7,47	}	
	KXY	8,10 - 8,32	}	
$ec_{3,1\ K}$	(Ni)	1164,895	(3)	0,0151 (9)
$ec_{1,0\ K}$	(Ni)	1324,157	(6)	0,0115 (6)
$ec_{1,0\ \alpha}$	(Ni)	310,51	(1)	0,0034 (4)
$\beta^-_{0,3}$	max:	317,32	(21)	99,88 (3)
$\beta^-_{0,3}$	avg:	95,6	(1)	
$\beta^-_{0,2}$	max:	664,46	(21)	0,002
$\beta^-_{0,2}$	avg:	274,8	(1)	
$\beta^-_{0,1}$	max:	1490,56	(21)	0,12 (3)
$\beta^-_{0,1}$	avg:	625,6	(1)	

5 Photon Emissions

5.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Ni)	0,74 — 0,94		0,0002	
$XK\alpha_2$	(Ni)	7,46097		0,00334 (12)	} $K\alpha$
$XK\alpha_1$	(Ni)	7,47824		0,0065 (3)	}
$XK\beta_3$	(Ni)	8,2647	}		
$XK\beta_1$	(Ni)		}	0,00136 (5)	$K'\beta_1$
$XK\beta''_5$	(Ni)	8,3287	}		

5.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{3,2}$(Ni)	347,14 (7)	0,0075 (4)
$\gamma_{2,1}$(Ni)	826,10 (3)	0,0076 (8)
$\gamma_{3,1}$(Ni)	1173,228 (3)	99,85 (3)
$\gamma_{1,0}$(Ni)	1332,492 (4)	99,9826 (6)
$\gamma_{2,0}$(Ni)	2158,57 (3)	0,0012 (2)
$\gamma_{3,0}$(Ni)	2505,692 (5)	0,0000020 (4)

6 Main Production Modes

$\begin{cases} \text{Co} - 59(\text{n},\gamma)\text{Co} - 60 \qquad \sigma : 18{,}7\ (5)\ \text{barns} \\ \text{Possible impurities : None.} \end{cases}$

7 References

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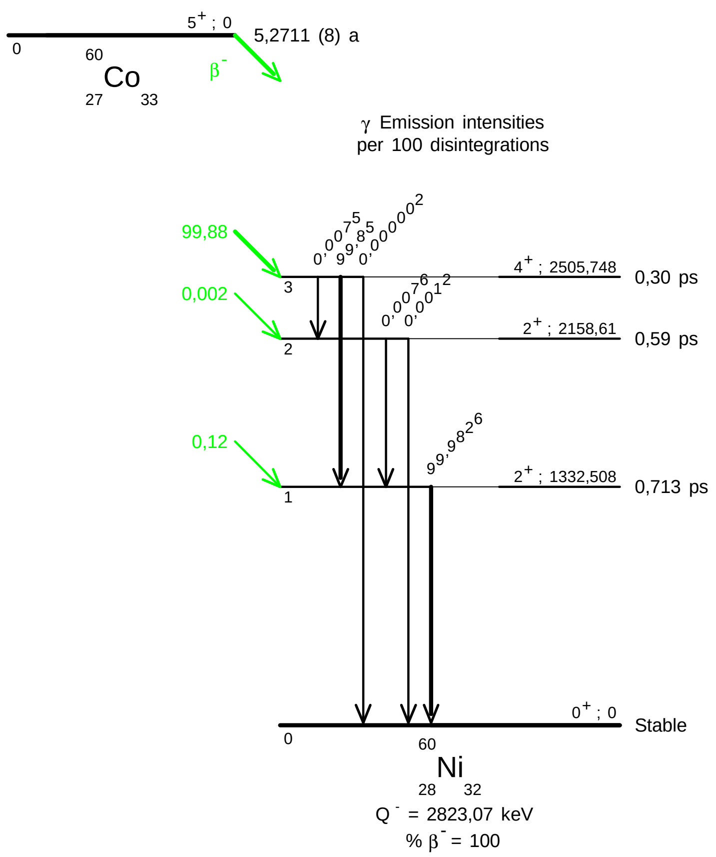
5+ ; 0
5,2711 (8) a
0
60 Co 27 33
β-
γ Emission intensities
per 100 disintegrations
99,88
0,002
0,12
3
2
1
0
0,0075
99,85
0,0002
0,0076
0,0012
99,9826
4+ ; 2505,748
0,30 ps
2+ ; 2158,61
0,59 ps
2+ ; 1332,508
0,713 ps
0+ ; 0
Stable
60 Ni 28 32
Q- = 2823,07 keV
% β- = 100