$^{57}_{27}$Co $_{30}$

1 Decay Scheme

Co-57 disintegrates by 100% electron capture to the excited levels of 706.42 keV (0.18%), and 136.47 keV (99.82%) in Fe-57.
Le cobalt 57 se désintègre à 100 % par capture électronique principalement vers les niveaux excités de 706 et 136 keV du fer 57.

2 Nuclear Data

$T_{1/2}(^{57}$Co)	:	271,80	(5)	d
$Q^{+}(^{57}$Co)	:	836,0	(4)	keV

2.1 Electron Capture Transitions

	Energy keV	Probability × 100	Nature	lg ft	P_K	P_L	P_M
$\epsilon_{0,4}$	129,6 (4)	0,183 (7)	Allowed	7,69	0,8789 (17)	0,1035 (14)	0,0168 (6)
$\epsilon_{0,3}$	469,2 (4)	< 0,002	2nd forbidden	> 10,8			
$\epsilon_{0,2}$	699,5 (4)	99,82 (20)	Allowed	6,45	0,8875 (16)	0,0963 (13)	0,0154 (5)
$\epsilon_{0,1}$	821,6 (4)	< 0,003	2nd forbidden	> 11,1			
$\epsilon_{0,0}$	836,0 (4)	< 0,00035	2nd forbidden unique	> 12,9			

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M (10^{-3})	α_T
$\gamma_{1,0}$(Fe)	14,41295 (31)	87,69 (7)	M1+0,0005%E2	7,69 (16)	0,782 (16)	113 (3)	8,58 (18)
$\gamma_{2,1}$(Fe)	122,06079 (12)	87,53 (8)	M1+1,4%E2	0,0212 (5)	0,00208 (5)	0,303 (7)	0,0236 (5)
$\gamma_{2,0}$(Fe)	136,47374 (29)	12,30 (18)	E2	0,133 (3)	0,0136 (3)	1,96 (4)	0,148 (3)
$\gamma_{3,2}$(Fe)	230,27 (3)	0,0004 (4)	M1+0,04%E2	0,00374 (8)	0,000356 (8)	0,0524 (11)	0,00415 (9)

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M (10^{-3})	α_T
$\gamma_{4,3}$(Fe)	339,67 (3)	0,0039 (4)	M1+0,7%E2	0,00149 (3)	0,000142 (3)	0,0208 (5)	0,00165 (4)
$\gamma_{3,1}$(Fe)	352,34 (2)	0,0032 (4)	M1+0,06%E2	0,00135 (3)	0,000129 (3)	0,0188 (4)	0,00150 (3)
$\gamma_{3,0}$(Fe)	366,74 (3)	0,0013 (4)	M1+17%E2	0,00160 (5)	0,000153 (5)	0,0223 (7)	0,00178 (6)
$\gamma_{4,2}$(Fe)	569,94 (4)	0,015 (2)	M1+0,94%E2	0,000458 (10)	0,0000434 (9)	0,00631 (14)	0,000508 (12)
$\gamma_{4,1}$(Fe)	692,01 (2)	0,159 (6)	M1+17,8%E2	0,000328 (10)	0,000031 (1)	0,00452 (14)	0,000364 (12)
$\gamma_{4,0}$(Fe)	706,42 (2)	0,0050 (5)	(E2)				

3 Atomic Data

3.1 Fe

ω_K	:	0,352	(4)
$\bar{\omega}_L$	:	0,0061	(5)
n_{KL}	:	1,456	(12)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	6,39084		50,7
	$K\alpha_1$	6,40384		100
	$K\beta_3$	7,05798	}	
	$K\beta_5''$	7,1081	}	21,4
X_L				
	$L\ell$	0,61		
	$L\beta$	– 0,79		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	5,37 – 5,64	100
KLX	6,16 – 6,40	23,9
KXY	6,91 – 7,10	2,2
Auger L	0,6 – 0,7	302

4 Electron Emissions

		Energy keV			Electrons per 100 disint.
e_{AL}	(Fe)	0,6 - 0,7			252 (3)
e_{AK}	(Fe)				105,2 (13)
	KLL	5,37 - 5,64	}		
	KLX	6,16 - 6,40	}		
	KXY	6,91 - 7,10	}		
$ec_{1,0\ K}$	(Fe)	7,3009 (3)			70,4 (20)
$ec_{1,0\ L}$	(Fe)	13,567 - 13,705			7,16 (20)
$ec_{1,0\ M}$	(Fe)	14,312 - 14,409			1,03 (3)
$ec_{2,1\ K}$	(Fe)	114,9486 (1)			1,81 (4)
$ec_{2,1\ L}$	(Fe)	121,215 - 121,353			0,178 (4)
$ec_{2,1\ M}$	(Fe)	121,968 - 122,057			0,0259 (6)
$ec_{2,0\ K}$	(Fe)	129,3616 (3)			1,42 (4)
$ec_{2,0\ L}$	(Fe)	135,628 - 135,766			0,146 (4)
$ec_{2,0\ M}$	(Fe)	136,381 - 136,470			0,0210 (5)

5 Photon Emissions

5.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Fe)	0,61 — 0,79		1,55 (13)	
$XK\alpha_2$	(Fe)	6,39084		16,8 (3)	} $K\alpha$
$XK\alpha_1$	(Fe)	6,40384		33,2 (5)	}
$XK\beta_3$	(Fe)	7,05798	}		
$XK\beta_1$	(Fe)		}	7,1 (2)	$K'\beta_1$
$XK\beta_5''$	(Fe)	7,1081	}		
$XK\beta_4$	(Fe)		}		$K'\beta_2$

5.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{1,0}$(Fe)	14,41295 (31)	9,15 (17)
$\gamma_{2,1}$(Fe)	122,06065 (12)	85,51 (6)
$\gamma_{2,0}$(Fe)	136,47356 (29)	10,71 (15)

	Energy keV	Photons per 100 disint.
$\gamma_{3,2}$(Fe)	230,27 (3)	0,0004 (4)
$\gamma_{4,3}$(Fe)	339,67 (3)	0,0038 (4)
$\gamma_{3,1}$(Fe)	352,34 (2)	0,0032 (4)
$\gamma_{3,0}$(Fe)	366,74 (3)	0,0013 (4)
$\gamma_{4,2}$(Fe)	569,94 (4)	0,015 (2)
$\gamma_{4,1}$(Fe)	692,01 (2)	0,159 (6)
$\gamma_{4,0}$(Fe)	706,42 (2)	0,0050 (5)

6 Main Production Modes

$\begin{cases} \text{Ni} - 60(\text{p},\alpha)\text{Co} - 57 \\ \text{Possible impurities : Co} - 56, \text{Co} - 58 \end{cases}$

$\begin{cases} \text{Ni} - 58(\text{p,2p})\text{Co} - 57 \\ \text{Possible impurities : Co} - 56, \text{Co} - 58 \end{cases}$

$\begin{cases} \text{Fe} - 56(\text{d,n})\text{Co} - 57 \\ \text{Possible impurities : Co} - 56, \text{Co} - 58 \end{cases}$

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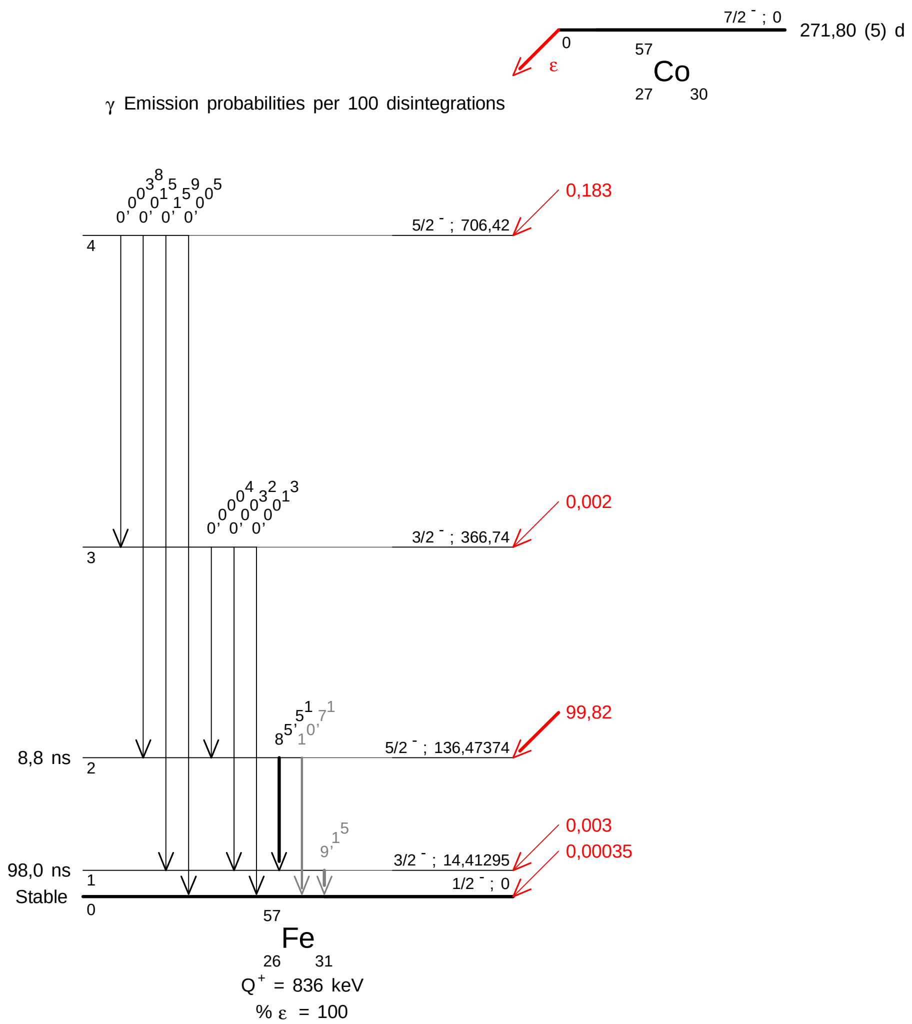
7/2 - ; 0
271,80 (5) d
0
ε
57
Co
27 30
γ Emission probabilities per 100 disintegrations
0,183
5/2 - ; 706,42
4
0,002
3/2 - ; 366,74
3
99,82
5/2 - ; 136,47374
8,8 ns
2
0,003
0,00035
3/2 - ; 14,41295
98,0 ns
1
1/2 - ; 0
Stable
0
57
Fe
26 31
Q+ = 836 keV
% ε = 100