$^{113}_{50}\mathrm{Sn}_{63}$

1 Decay Scheme

Sn-113 decays by electron capture mainly to the In-113m isomer which has a half-life of 99 minutes. After a sufficient time, the ratio of the In-113m (99 min) and Sn-113 activities remains constant and is 1,0006. The values given here are the nuclides in equibium.

Le Sn-113 se désintègre par capture électronique conduisant principalement à l'isomère In-113m ayant 99 min de période.
Lorsque In-113m et Sn-113 sont à l'équilibre le rapport des activités de ces deux radionucléides est : 1,0006. Les valeurs sont données ici à l'équilibre.

2 Nuclear Data

$T_{1/2}(^{113}\mathrm{Sn})$	:	115,09	(3)	d
$T_{1/2}(^{113\mathrm{m}}\mathrm{In})$	:	1,6579	(38)	h
$Q^{+}(^{113}\mathrm{Sn})$	:	1036,0	(28)	keV

2.1 Electron Capture Transitions

	Energy (keV)	Probability (%)	Nature	lg ft	P_K	P_L	P_M
$\epsilon_{0,3}$	6 (3)	0,00103 (4)	Allowed	6,5		0,3 (3)	0,54 (20)
$\epsilon_{0,2}$	389 (3)	2,21 (8)	1st Forbidden	8,2	0,8490 (14)	0,121 (1)	0,0254 (5)
$\epsilon_{0,1}$	644 (3)	97,79 (8)	1st Forbidden	7,01	0,855 (1)	0,116 (1)	0,0241 (5)

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy (keV)	$\mathrm{P}_{\gamma+\mathrm{ce}}$ (%)	Multipolarity	α_K	α_L (10^{-2})	α_M (10^{-2})	α_N (10^{-3})	α_T
$\gamma_{2,1}$(In)	255,134 (10)	2,21 (8)	M1+33%E2	0,0396 (12)	0,549 (16)	0,1078 (32)	0,211 (6)	0,0464 (14)
$\gamma_{3,2}$(In)	382,90 (8)	0,000060 (3)						
$\gamma_{1,0}$(In)	391,698 (3)	100,00 (17)	M4	0,437 (4)	8,58 (26)	1,70 (5)	3,77 (11)	0,540 (4)
$\gamma_{3,1}$(In)	638,03 (8)	0,00097 (4)						
$\gamma_{2,0}$(In)	646,83 (1)	0,000004 (2)	[E3]					

3 Atomic Data

3.1 In

ω_K : 0,851 (4)
$\bar{\omega}_L$: 0,0684 (20)
n_{KL} : 0,944 (4)

3.1.1 X Radiations

	Energy (keV)	Relative probability
X_K		
$K\alpha_2$	24,0023	53,3
$K\alpha_1$	24,21	100
$K\beta_3$	27,238	27,8
$K\beta_1$	27,2762	
$K\beta_5''$	27,495	
$K\beta_2$	27,861	5,4
$K\beta_4$	27,928	
$KO_{2,3}$	27,939	
X_L		
$L\ell$	2,9	
$L\alpha$	3,28 - 3,29	
$L\eta$	3,11	
$L\beta$	3,49 - 3,79	
$L\gamma$	3,82 - 4,16	

3.1.2 Auger Electrons

	Energy (keV)	Relative probability
Auger K		
KLL	19,34 - 20,35	100
KLX	22,83 - 24,19	43,6
KXY	26,25 - 27,90	5,7
Auger L	2,0 - 4,2	

4 Electron Emissions

		Energy (keV)	Electrons (per 100 disint.)
e_{AL}	(In)	2,0 - 4,2	116,3 (6)
e_{AK}	(In)		
	KLL	19,34 - 20,35	17,0 (5)
	KLX	22,83 - 24,19	
	KXY	26,25 - 27,90	
$ec_{2,1\ K}$	(In)	227,194 (10)	0,0836 (41)
$ec_{2,1\ L}$	(In)	250,896 - 251,404	0,0116 (6)
$ec_{1,0\ K}$	(In)	363,758 (3)	28,39 (27)
$ec_{1,0\ L}$	(In)	387,460 - 387,968	5,57 (17)
$ec_{1,0\ M}$	(In)	390,872 - 391,255	1,104 (33)
$ec_{1,0\ N}$	(In)	391,576 - 391,682	0,245 (7)
$ec_{1,0\ T}$	(In)	363,758 - 391,682	35,31 (28)

5 Photon Emissions

5.1 X-Ray Emissions

		Energy (keV)	Photons (per 100 disint.)	
XL	(In)	2,9 - 4,16	8,48 (19)	
$XK\alpha_2$	(In)	24,0023	27,69 (21)	Kα
$XK\alpha_1$	(In)	24,21	51,9 (3)	
$XK\beta_3$	(In)	27,238	14,58 (17)	$K'\beta_1$
$XK\beta_1$	(In)	27,2762		
$XK\beta_5''$	(In)	27,495		
$XK\beta_2$	(In)	27,861	2,77 (10)	$K'\beta_2$
$XK\beta_4$	(In)	27,928		
$XKO_{2,3}$	(In)	27,939		

5.2 Gamma Emissions

	Energy (keV)	Photons (per 100 disint.)
$\gamma_{2,1}$(In)	255,134 (10)	2,11 (8)
$\gamma_{3,2}$(In)	382,90 (8)	0,000060 (3)
$\gamma_{1,0}$(In)	391,698 (3)	64,97 (17)
$\gamma_{3,1}$(In)	638,03 (8)	0,00097 (4)
$\gamma_{2,0}$(In)	646,83 (1)	0,000004 (2)

6 Main Production Modes

$\mathrm{Sn-112(n,\gamma)Sn-113m}$ σ : 0,30 (4) barns

$\mathrm{Sn-113m(IT)Sn-113}$ $T_{1/2}$: 20 min

$\mathrm{Sn-112(n,\gamma)Sn-113}$ σ : 0,71 (10) barns
Possible impurities: $\mathrm{Sn-119m}$, $\mathrm{Sn-121m}$, $\mathrm{Sn-117m}$, $\mathrm{Sn-123}$, $\mathrm{Sn-125m}$

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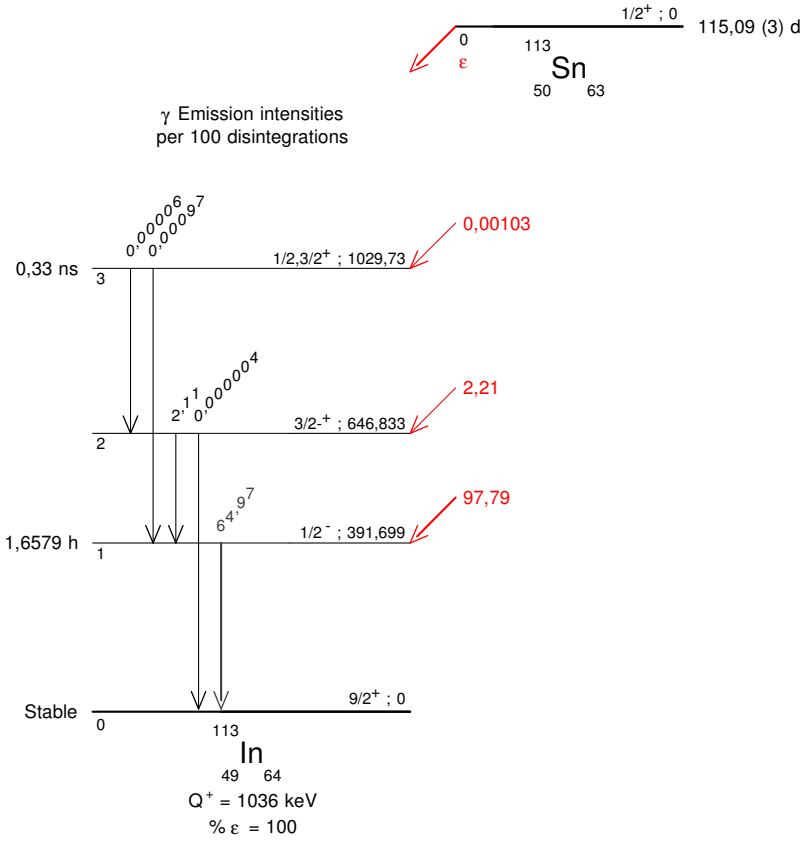
1/2+ ; 0
115,09 (3) d
0
ε
113
Sn
50 63
γ Emission intensities
per 100 disintegrations
0,00103
0,33 ns
3
1/2,3/2+ ; 1029,73
2,21
3/2-+ ; 646,833
2
97,79
1,6579 h
1
1/2 - ; 391,699
Stable
0
9/2+ ; 0
113
In
49 64
Q+ = 1036 keV
% ε = 100