



1 Decay Scheme

Sn-113 disintegrates by electron capture mainly to the In-113 isomer which has a half-life of 99 minutes. After a sufficient time, the ratio of the In-113 (99 min) and Sn-113 activities remains constant and is 1,0006.

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.

2 Nuclear Data

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

2.1 Electron Capture Transitions

	Energy keV	Probability $\times 100$	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	0,849	0,121	0,0254
$\epsilon_{0,1}$	644 (3)	97,79 (8)	1st Forbidden	7,01	0,855	0,116	0,0241

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ $\times 100$	Multipolarity	α_K	α_L (10^{-2})	α_M (10^{-2})	α_N (10^{-3})	α_T
$\gamma_{2,1}(\text{In})$	255,134 (10)	2,21 (8)	M1+33%E2	0,039 (5)	0,54 (11)	0,105 (22)	0,22 (5)	0,046 (6)
$\gamma_{3,2}(\text{In})$	382,90 (8)	0,000060 (3)						
$\gamma_{1,0}(\text{In})$	391,698 (3)	100,00 (17)	M4	0,437 (4)	8,58 (26)	1,70 (5)	3,77 (11)	0,540 (4)
$\gamma_{3,1}(\text{In})$	638,03 (8)	0,00097 (4)						

	Energy keV	$P_{\gamma+ce}$ $\times 100$	Multipolarity	α_K	α_L (10^{-2})	α_M (10^{-2})	α_N (10^{-3})	α_T
$\gamma_{2,0}(\text{In})$	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		
$K\alpha_2$	24,0020	53,3
$K\alpha_1$	24,2097	100
$K\beta_3$	27,2377	}
$K\beta_1$	27,2759	}
$K\beta_5''$	27,491	}
$K\beta_5'$	27,499	}
$K\beta_2$	27,8608	}
$K\beta_4$	27,928	}
$KO_{2,3}$	27,940	}
X_L		
$L\ell$	2,90	
$L\gamma$	- 4,23	

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	116,9 (9)
e _{AK}	(In)		17,02 (14)
	KLL	19,34 - 20,35	}
	KLX	22,83 - 24,19	}
	KXY	26,25 - 27,90	}
ec _{2,1} K	(In)	227,194 (10)	0,08 (1)
ec _{2,1} L	(In)	250,896 - 251,404	0,011 (2)
ec _{1,0} K	(In)	363,758 (3)	28,4 (3)
ec _{1,0} L	(In)	387,460 - 387,968	5,6 (2)
ec _{1,0} M	(In)	390,872 - 391,034	1,11 (4)
ec _{1,0} N	(In)	391,576 - 391,621	0,24 (1)

5 Photon Emissions

5.1 X-Ray Emissions

		Energy keV	Photons per 100 disint.
XL	(In)	2,90 — 4,23	8,6 (3)
XK α_2	(In)	24,0020	27,85 (22) } K α
XK α_1	(In)	24,2097	52,2 (4) }
XK β_3	(In)	27,2377	}
XK β_1	(In)	27,2759	} 14,60 (12) K' β_1
XK β_5''	(In)	27,491	}
XK β_5'	(In)	27,499	}
XK β_2	(In)	27,8608	}
XK β_4	(In)	27,928	} 2,84 (2) K' β_2
XKO _{2,3}	(In)	27,940	}

5.2 Gamma Emissions

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

6 Main Production Modes

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

$\text{Sn} - 113\text{m}(\text{I.T.})\text{Sn} - 113$

$T_{1/2} : 20$ min

$\left\{ \begin{array}{l} \text{Sn} - 112(\text{n},\gamma)\text{Sn} - 113 \quad \sigma : 0,71$ (1) barns
Possible impurities : $\text{Sn} - 119\text{m}, \text{Sn} - 121\text{m}, \text{Sn} - 117\text{m}, \text{Sn} - 123, \text{Sn} - 125\text{m}$

7 References

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