



## 1 Decay Scheme

*Sb-125 decays by beta minus emission to levels in Te-125. The percentage of disintegrations to the Te-125m ( $T_{1/2} = 57$  d) is  $p = 22.9$  (9)%. The two gamma emission intensities with energy 35-keV and 109-keV are given for the two nuclides being in equilibrium.*

L'antimoine 125 se désintègre par émissions bêta moins vers des niveaux excités de tellure 125. Les intensités des deux émissions gamma de 35 keV et 109 keV sont données pour les deux radionucléides étant à l'équilibre. Le pourcentage de désintégrations conduisant à l'isomère de Te-125 de 57 jours de période est  $p = 22,9$  (9) %.

Le rapport au temps  $t$  des activités Te-125m/Sb-125 dans le Sb-125 initialement pur est :

$$p \times [T_1 / (T_1 - T_2)] \times [1 - e^{-(\text{Log} 2 \times [(T_1 - T_2) / (T_1 \times T_2)] \times t}]$$

$T_1$  et  $T_2$  étant respectivement les périodes de Sb-125 et Te-125m.

Pour  $t \geq 1,6$  a, ce qui correspond à dix fois la période de Te-125m, ce rapport est égal à :

$$p \times [T_1 / (T_1 - T_2)] = 0,243 \text{ (10)}$$

avec  $p = 0,229$  (9).

## 2 Nuclear Data

$$\begin{aligned} T_{1/2} (^{125}\text{Sb}) &: 2,75855 \text{ (25) a} \\ Q^- (^{125}\text{Sb}) &: 766,7 \text{ (21) keV} \end{aligned}$$

### 2.1 $\beta^-$ Transitions

	Energy (keV)	Probability (%)	Nature	lg $ft$
$\beta_{0,12}^-$	95,3 (21)	13,58 (12)	Allowed	6,93
$\beta_{0,10}^-$	124,5 (21)	5,82 (5)	Allowed	7,66
$\beta_{0,9}^-$	130,6 (21)	18,07 (19)	Allowed	7,23
$\beta_{0,7}^-$	241,5 (21)	1,251 (12)	1st Forbidden	9,23
$\beta_{0,6}^-$	303,3 (21)	40,3 (4)	Allowed	8,04
$\beta_{0,5}^-$	323,1 (21)	0,089 (10)	2nd Forbidden	10,79
$\beta_{0,3}^-$	444,0 (21)	7,54 (9)	1st Forbidden	9,32
$\beta_{0,2}^-$	621,0 (21)	13,4 (9)	Unique 1st Forbidden	9,77

## 2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy (keV)	P <sub>γ+ce</sub> (%)	Multipolarity	α <sub>K</sub>	α <sub>L</sub>	α <sub>M</sub>	α <sub>T</sub>
γ <sub>6,5</sub> (Te)	19,80 (6)	0,248 (9)	[M1]		9,1 (3)	1,82 (5)	11,3 (3)
γ <sub>1,0</sub> (Te)	35,489 (5)	88,7 (37)	M1+0,084%E2	12,1 (4)	1,64 (5)	0,329 (10)	14,3 (4)
γ <sub>2,1</sub> (Te)	109,276 (15)	24,3 (9)	M4	182 (5)	135 (4)	31 (1)	355 (11)
γ <sub>9,7</sub> (Te)	110,895 (12)	0,00125 (10)	[E1]	0,127 (4)	0,0165 (5)	0,00328 (11)	0,147 (4)
γ <sub>10,7</sub> (Te)	116,955 (11)	0,2964 (46)	E1	0,109 (3)	0,0141 (4)	0,00281 (8)	0,127 (4)
γ <sub>9,6</sub> (Te)	172,719 (8)	0,221 (10)	M1(+E2)	0,129 (4)	0,0168 (5)	0,00337 (11)	0,151 (5)
γ <sub>3,2</sub> (Te)	176,314 (2)	7,96 (9)	M1+26,5%E2	0,139 (4)	0,0221 (7)	0,00449 (13)	0,167 (5)
γ <sub>10,6</sub> (Te)	178,842 (5)	0,0405 (22)	M1+E2	0,147 (26)	0,026 (11)	0,0054 (21)	0,18 (4)
γ <sub>10,5</sub> (Te)	198,654 (11)	0,0152 (8)	[E2]	0,123 (4)	0,0245 (8)	0,00504 (15)	0,154 (5)
γ <sub>7,3</sub> (Te)	204,138 (10)	0,353 (17)	M1+72%E2	0,104 (3)	0,0189 (6)	0,00386 (11)	0,128 (4)
γ <sub>12,6</sub> (Te)	208,077 (5)	0,269 (9)	M1+1,1%E2	0,0791 (24)	0,0102 (3)	0,00205 (6)	0,092 (3)
γ <sub>12,5</sub> (Te)	227,891 (10)	0,142 (3)	(M1+E2)	0,070 (11)	0,011 (4)	0,0023 (6)	0,084 (13)
γ <sub>9,3</sub> (Te)	314,95 (11)	0,0043 (3)	(E1)	0,00726 (22)	0,00089 (3)	0,000179 (5)	0,00839 (30)
γ <sub>10,3</sub> (Te)	321,040 (4)	0,420 (4)	E1	0,00691 (21)	0,000856 (30)	0,000170 (5)	0,00798 (24)
γ <sub>7,2</sub> (Te)	380,452 (8)	1,548 (15)	E2	0,0154 (5)	0,00233 (7)	0,000473 (15)	0,0183 (5)
γ <sub>5,1</sub> (Te)	408,065 (10)	0,185 (2)	M1+69%E2	0,0129 (4)	0,00181 (5)	0,00036 (1)	0,0152 (5)
γ <sub>6,1</sub> (Te)	427,874 (4)	29,96 (24)	M1+22,4%E2	0,0119 (4)	0,00154 (5)	0,00031 (1)	0,0138 (4)
γ <sub>5,0</sub> (Te)	443,555 (9)	0,309 (4)	M1+84%E2	0,0100 (3)	0,00142 (4)	0,00029 (1)	0,0118 (4)
γ <sub>6,0</sub> (Te)	463,365 (4)	10,59 (9)	E2	0,0086 (3)	0,00124 (4)	0,00025 (1)	0,0102 (3)
γ <sub>10,2</sub> (Te)	497,37 (12)	0,0033 (3)	[M2]	0,0271 (8)	0,00373 (11)	0,00075 (2)	0,0318 (10)
γ <sub>9,1</sub> (Te)	600,599 (2)	17,85 (18)	E2	0,00421 (13)	0,00058 (2)	0,000116 (4)	0,00498 (15)
γ <sub>10,1</sub> (Te)	606,715 (3)	5,05 (5)	E2	0,00415 (13)	0,00056 (2)	0,000113 (4)	0,00485 (15)
γ <sub>12,1</sub> (Te)	635,950 (3)	11,38 (10)	M1+9,9%E2	0,00455 (14)	0,00057 (2)	0,000113 (5)	0,00526 (16)
γ <sub>12,0</sub> (Te)	671,443 (6)	1,790 (16)	E2	0,00319 (10)	0,00043 (1)	0,000086 (2)	0,00373 (11)

## 3 Atomic Data

### 3.1 Te

ω <sub>K</sub>	:	0,875	(4)
ω <sub>L</sub>	:	0,0862	(35)
n <sub>KL</sub>	:	0,917	(4)

#### 3.1.1 X Radiations

	Energy (keV)	Relative probability
X <sub>K</sub>		
Kα <sub>2</sub>	27,202	53,7
Kα <sub>1</sub>	27,473	100
Kβ <sub>3</sub>	30,945	28,6
Kβ <sub>1</sub>	30,996	
Kβ <sub>5</sub> ''	31,236	
Kβ <sub>2</sub>	31,701	6,2
Kβ <sub>4</sub>	31,774	
KO <sub>2,3</sub>	31,812	

**3.1.2 Auger Electrons**

	Energy (keV)	Relative probability
Auger K		
KLL	21,804 - 22,989	100
KLX	25,814 - 27,470	45,5
KXY	29,80 - 31,81	5,1

**4 Electron Emissions**

		Energy (keV)	Electrons (per 100 disint.)
e <sub>AL</sub>	(Te)	2,3 - 4,8	70,6 (9)
e <sub>AK</sub>	(Te)		
	KLL	21,804 - 22,989	} 10,5 (6)
	KLX	25,814 - 27,470	
	KXY	29,80 - 31,81	
ec <sub>1,0</sub> T	(Te)	3,675 - 35,487	82,8 (35)
ec <sub>1,0</sub> K	(Te)	3,675 (5)	70,1 (32)
ec <sub>6,5</sub> L	(Te)	14,9 - 15,5	0,184 (8)
ec <sub>6,5</sub> M	(Te)	18,8 - 19,2	0,0368 (14)
ec <sub>1,0</sub> L	(Te)	30,550 - 31,148	9,5 (4)
ec <sub>1,0</sub> M	(Te)	34,483 - 34,917	1,9 (1)
ec <sub>2,1</sub> T	(Te)	77,462 - 109,274	24,2 (9)
ec <sub>2,1</sub> K	(Te)	77,462 (15)	12,43 (41)
ec <sub>10,7</sub> K	(Te)	85,141 (11)	0,0287 (9)
ec <sub>2,1</sub> L	(Te)	104,337 - 104,935	9,22 (32)
ec <sub>2,1</sub> M	(Te)	108,270 - 108,704	2,12 (8)
ec <sub>2,1</sub> N	(Te)	109,108 - 109,236	0,451 (16)
ec <sub>9,6</sub> K	(Te)	140,905 (8)	0,0248 (14)
ec <sub>3,2</sub> T	(Te)	144,500 - 176,312	1,139 (36)
ec <sub>3,2</sub> K	(Te)	144,500 (2)	0,948 (29)
ec <sub>3,2</sub> L	(Te)	171,375 - 171,973	0,151 (5)
ec <sub>7,3</sub> K	(Te)	172,32 (1)	0,0326 (18)
ec <sub>3,2</sub> M	(Te)	175,308 - 175,742	0,0306 (9)
ec <sub>12,6</sub> K	(Te)	176,263 (5)	0,0195 (9)
ec <sub>7,2</sub> K	(Te)	348,638 (8)	0,0234 (8)
ec <sub>6,1</sub> K	(Te)	396,060 (4)	0,352 (12)
ec <sub>6,1</sub> L	(Te)	422,935 - 423,533	0,0455 (15)
ec <sub>6,0</sub> K	(Te)	431,551 (4)	0,0901 (32)
ec <sub>6,0</sub> L	(Te)	458,426 - 459,024	0,01300 (43)
ec <sub>9,1</sub> K	(Te)	568,785 (2)	0,0748 (24)
ec <sub>10,1</sub> K	(Te)	574,901 (3)	0,0208 (7)
ec <sub>9,1</sub> L	(Te)	595,660 - 596,258	0,01030 (37)
ec <sub>12,1</sub> K	(Te)	604,136 (3)	0,0515 (16)

		Energy (keV)		Electrons (per 100 disint.)
$\beta_{0,12}^-$	max:	95,3	(21)	13,58 (12)
	avg:	24,9	(6)	
$\beta_{0,10}^-$	max:	124,5	(21)	5,82 (5)
	avg:	33,0	(6)	
$\beta_{0,9}^-$	max:	130,6	(21)	18,07 (19)
	avg:	34,7	(6)	
$\beta_{0,7}^-$	max:	241,5	(21)	1,251 (12)
	avg:	67,5	(7)	
$\beta_{0,6}^-$	max:	303,3	(21)	40,3 (4)
	avg:	86,9	(7)	
$\beta_{0,5}^-$	max:	323,1	(21)	0,089 (10)
	avg:	93,3	(7)	
$\beta_{0,3}^-$	max:	444,0	(21)	7,54 (9)
	avg:	134,5	(8)	
$\beta_{0,2}^-$	max:	621,0	(21)	13,4 (9)
	avg:	215,5	(8)	

## 5 Photon Emissions

### 5.1 X-Ray Emissions

		Energy (keV)	Photons (per 100 disint.)		
XL	(Te)	3,335 - 4,823	6,56 (21)		
XK $\alpha_2$	(Te)	27,202	21,0 (9)	}	K $\alpha$
XK $\alpha_1$	(Te)	27,473	39,1 (15)		
XK $\beta_3$	(Te)	30,945	11,2 (5)	}	K' $\beta_1$
XK $\beta_1$	(Te)	30,996			
XK $\beta_5''$	(Te)	31,236			
XK $\beta_2$	(Te)	31,701	2,43 (12)	}	K' $\beta_2$
XK $\beta_4$	(Te)	31,774			
XK $O_{2,3}$	(Te)	31,812			

### 5.2 Gamma Emissions

		Energy (keV)	Photons (per 100 disint.)
$\gamma_{6,5}(\text{Te})$	19,80 (6)	0,0202 (5)	
$\gamma_{1,0}(\text{Te})$	35,489 (5)	5,79 (18)	

	Energy (keV)	Photons (per 100 disint.)
$\gamma_{2,1}(\text{Te})$	109,276 (15)	0,0683 (12)
$\gamma_{9,7}(\text{Te})$	110,895 (12)	0,00109 (9)
$\gamma_{10,7}(\text{Te})$	116,955 (11)	0,263 (4)
$\gamma_{9,6}(\text{Te})$	172,719 (8)	0,192 (9)
$\gamma_{3,2}(\text{Te})$	176,314 (2)	6,82 (7)
$\gamma_{10,6}(\text{Te})$	178,842 (5)	0,0343 (15)
$\gamma_{10,5}(\text{Te})$	198,654 (11)	0,0132 (7)
$\gamma_{7,3}(\text{Te})$	204,138 (10)	0,313 (15)
$\gamma_{12,6}(\text{Te})$	208,077 (5)	0,246 (8)
$\gamma_{12,5}(\text{Te})$	227,891 (10)	0,131 (3)
$\gamma_{9,3}(\text{Te})$	314,95 (11)	0,0043 (3)
$\gamma_{10,3}(\text{Te})$	321,040 (4)	0,416 (4)
$\gamma_{7,2}(\text{Te})$	380,452 (8)	1,520 (15)
$\gamma_{5,1}(\text{Te})$	408,065 (10)	0,182 (2)
$\gamma_{6,1}(\text{Te})$	427,874 (4)	29,55 (24)
$\gamma_{5,0}(\text{Te})$	443,555 (9)	0,305 (4)
$\gamma_{6,0}(\text{Te})$	463,365 (4)	10,48 (9)
$\gamma_{10,2}(\text{Te})$	497,37 (12)	0,0032 (3)
$\gamma_{9,1}(\text{Te})$	600,597 (2)	17,76 (18)
$\gamma_{10,1}(\text{Te})$	606,713 (3)	5,02 (5)
$\gamma_{12,1}(\text{Te})$	635,950 (3)	11,32 (10)
$\gamma_{12,0}(\text{Te})$	671,441 (6)	1,783 (16)

## 6 Main Production Modes

$\text{Sn} - 124(\text{n}, \gamma) \text{Sn} - 125\text{m}$      $\sigma : 0,130$  (5) barns

$\text{Sn} - 125\text{m}(\beta^-) \text{Sb} - 125$      $T_{1/2} : 9,7$  min

{  $\text{Sn} - 124(\text{n}, \gamma) \text{Sn} - 125$      $\sigma : 0,004$  (2) barns  
Possible impurities:  $\text{Sn} - 113$ ,  $\text{Sn} - 117\text{m}$ ,  $\text{Sn} - 119\text{m}$ ,  $\text{Sn} - 121\text{m}$ ,  $\text{Sn} - 123\text{m}$ ,  $\text{Sn} - 125$

$\text{Sn} - 125(\beta^-) \text{Sb} - 125$      $T_{1/2} : 9,5$  d

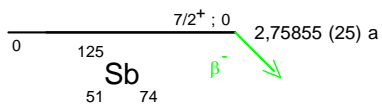
{ Fission product  
Possible impurities:  $\text{Sb} - 121\text{m}$ ,  $\text{Sn} - 125$

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γ Emission intensities per 100 disintegrations

