



1 Decay Scheme

Se-73 (half-life of 7.10 h) decays by 100% electron capture/beta plus to various excited levels of As-73 that populate the ground state of As-73 (half-life of 80.30 d).

Le selenium 73 (7,10 h) se désintègre à 100% par capture électronique et transitions bêta plus vers plusieurs niveaux excités de l'arsenic 73.

2 Nuclear Data

$T_{1/2}(^{73}\text{Se})$:	7,10	(9)	h
$T_{1/2}(^{73}\text{As})$:	80,30	(6)	d
$Q^+(^{73}\text{Se})$:	2725	(7)	keV

2.1 Electron Capture Transitions

	Energy (keV)	Probability (%)	Nature	lg ft	P_K	P_L	P_M
$\epsilon_{0,20}$	141 (7)	0,0155 (20)	(non-unique 1st forbidden)	6,2	0,8646 (19)	0,1136 (16)	0,0199 (5)
$\epsilon_{0,19}$	242 (7)	0,0087 (20)	(allowed)	7	0,8723 (16)	0,1072 (13)	0,0186 (4)
$\epsilon_{0,18}$	249 (7)	0,0029 (10)	(allowed)	7,5	0,8726 (16)	0,1070 (13)	0,0186 (4)
$\epsilon_{0,17}$	291 (7)	0,0048 (19)	(non-unique 2nd forbidden)	7,4	0,8740 (16)	0,1058 (13)	0,0184 (4)
$\epsilon_{0,16}$	413 (7)	0,157 (6)	(allowed)	6,2	0,8764 (16)	0,1038 (13)	0,0180 (4)
$\epsilon_{0,15}$	544 (7)	0,030 (8)	(allowed)	7,1	0,8778 (15)	0,1027 (13)	0,0178 (4)
$\epsilon_{0,14}$	750 (7)	0,094 (3)	(allowed)	6,9	0,8789 (15)	0,1018 (13)	0,0176 (4)
$\epsilon_{0,13}$	763 (7)	0,017 (5)	(allowed)	7,7	0,8790 (15)	0,1017 (13)	0,0176 (4)
$\epsilon_{0,12}$	815 (7)	0,060 (7)	(allowed)	7,2	0,8792 (15)	0,1016 (13)	0,0175 (4)
$\epsilon_{0,11}$	874 (7)	0,433 (11)	(allowed)	6,4	0,8794 (15)	0,1014 (12)	0,0175 (4)
$\epsilon_{0,10}$	1396 (7)	0,129 (3)	(allowed)	7,3	0,8804 (15)	0,1006 (12)	0,0173 (4)
$\epsilon_{0,8}$	1432 (7)	0,435 (19)	(allowed)	6,8	0,8804 (15)	0,1006 (12)	0,0173 (4)
$\epsilon_{0,7}$	1450 (7)	0,0057 (19)	(allowed)	8,7	0,8804 (15)	0,1006 (12)	0,0173 (4)
$\epsilon_{0,6}$	1547 (7)	0,178 (2)	(non-unique 1st forbidden)	7,3	0,8805 (15)	0,1005 (12)	0,0173 (4)
$\epsilon_{0,2}$	2297 (7)	33,3 (5)	allowed	5,36	0,8810 (15)	0,1001 (12)	0,0172 (4)
$\epsilon_{0,1}$	2658 (7)	0,51 (9)	unique 1st forbidden	8,7	0,8811 (15)	0,1000 (12)	0,0172 (4)

2.2 β^+ Transitions

	Energy (keV)	Probability (%)	Nature	lg <i>ft</i>
$\beta_{0,10}^+$	374 (7)	0,0034 (2)	(allowed)	7,3
$\beta_{0,8}^+$	410 (7)	0,017 (2)	(allowed)	6,8
$\beta_{0,7}^+$	428 (7)	0,0003 (1)	(allowed)	8,7
$\beta_{0,6}^+$	525 (7)	0,017 (1)	(non-unique 1st forbidden)	7,3
$\beta_{0,2}^+$	1275 (7)	63,9 (5)	allowed	5,36
$\beta_{0,1}^+$	1636 (7)	0,69 (11)	unique 1st forbidden	8,7

2.3 Gamma Transitions and Internal Conversion Coefficients

	Energy (keV)	P _{$\gamma+ce$} (%)	Multipolarity	α_K (10 ⁻⁵)	α_L (10 ⁻⁶)	α_M (10 ⁻⁶)	α_T (10 ⁻⁴)	α_π (10 ⁻⁵)
$\gamma_{1,0}(\text{As})$	67,039 (8)	90 (9)	100%M1	24100 (400)	26400 (400)	4040 (60)	2720 (40)	
$\gamma_{2,1}(\text{As})$	360,867 (23)	98,18 (20)	M2+0.12%E3	1165 (17)	1286 (18)	197 (3)	131,5 (19)	
$\gamma_{2,0}(\text{As})$	427,906 (21)	0,079 (14)	E3	1195 (17)	1397 (20)	213 (3)	135,7 (19)	
$\gamma_{3,1}(\text{As})$	443,016 (19)	0,050 (3)	(E1)	92,6 (13)	95,5 (14)	14,54 (21)	10,37 (15)	
$\gamma_{3,0}(\text{As})$	510,055 (17)	0,26 (3)	(E1)	65,0 (10)	67,0 (10)	10,20 (15)	7,28 (11)	
$\gamma_{11,8}(\text{As})$	557,50 (11)	0,052 (2)	(M1+E2)					
$\gamma_{11,7}(\text{As})$	575,45 (9)	0,146 (7)	(M1+E2)					
$\gamma_{(-1,1)}(\text{As})$	600,3 (3)	0,020 (3)						
$\gamma_{5,2}(\text{As})$	609,22 (4)	0,049 (4)	(E2)	125,8 (18)	132,7 (19)	20,2 (3)	14,12 (20)	
$\gamma_{14,9}(\text{As})$	682,04 (11)	0,019 (2)	(E1)	33,0 (5)	33,8 (5)	5,15 (8)	3,69 (6)	
$\gamma_{14,7}(\text{As})$	700,27 (13)	0,044 (2)	(M1+E2)					
$\gamma_{7,3}(\text{As})$	765,09 (7)	0,127 (2)	(M1+E2)					
$\gamma_{9,3}(\text{As})$	783,32 (4)	0,058 (2)	(M1+E2)					
$\gamma_{(-1,2)}(\text{As})$	793,0 (5)	0,064 (2)						
$\gamma_{11,5}(\text{As})$	813,46 (6)	0,009 (1)	(E2)	57,3 (8)	59,7 (9)	9,10 (13)	6,42 (9)	
$\gamma_{10,3}(\text{As})$	818,84 (5)	0,036 (2)	(M1+E2)					
$\gamma_{7,2}(\text{As})$	847,23 (7)	0,078 (6)	(M1+E2)					
$\gamma_{11,4}(\text{As})$	856,82 (5)	0,023 (6)	(E1)	20,3 (3)	20,7 (3)	3,16 (5)	2,27 (4)	
$\gamma_{8,2}(\text{As})$	865,18 (10)	0,50 (2)	(M1+E2)					
$\gamma_{9,2}(\text{As})$	865,46 (3)	0,02 (1)	(M1+E2)					
$\gamma_{12,5}(\text{As})$	873,00 (12)	0,038 (7)	(E2)	47,9 (7)	49,9 (7)	7,60 (11)	5,37 (8)	
$\gamma_{15,9}(\text{As})$	887,29 (10)	0,011 (8)	(M1+E2)					
$\gamma_{10,2}(\text{As})$	900,98 (5)	0,135 (2)	(M1+E2)					
$\gamma_{4,1}(\text{As})$	926,727 (14)	0,004 (1)	(M1+E2)					
$\gamma_{(-1,3)}(\text{As})$	930,09 (15)	0,005 (1)						
$\gamma_{13,4}(\text{As})$	968,0 (2)	0,012 (5)						
$\gamma_{16,10}(\text{As})$	982,74 (8)	0,034 (1)	(M1+E2)					
$\gamma_{4,0}(\text{As})$	993,766 (12)	0,005 (1)	(E2)	35,0 (5)	36,3 (5)	5,52 (8)	3,92 (6)	
$\gamma_{15,6}(\text{As})$	1002,61 (10)	0,004 (1)	(E1)	14,84 (21)	15,17 (22)	2,31 (4)	1,660 (24)	
$\gamma_{16,9}(\text{As})$	1018,26 (7)	0,053 (2)	(M1+E2)					
$\gamma_{16,7}(\text{As})$	1036,49 (9)	0,015 (1)	(M1+E2)					
$\gamma_{6,1}(\text{As})$	1111,013 (23)	0,201 (2)	(M1+E2)					
$\gamma_{19,10}(\text{As})$	1153,98 (24)	0,005 (1)	(M1+E2)					
$\gamma_{17,7}(\text{As})$	1159,0 (4)	0,003 (1)						
$\gamma_{7,1}(\text{As})$	1208,10 (7)	0,004 (1)	(E1)	10,50 (15)	10,72 (15)	1,632 (23)	1,700 (24)	5,25 (8)
$\gamma_{(-1,4)}(\text{As})$	1215,4 (8)	0,063 (10)						
$\gamma_{9,1}(\text{As})$	1226,33 (3)	0,003 (2)	(E1)	10,23 (15)	10,43 (15)	1,589 (23)	1,79 (3)	6,43 (9)
$\gamma_{(-1,5)}(\text{As})$	1249,9 (2)	0,004 (1)						
$\gamma_{7,0}(\text{As})$	1275,14 (7)	0,007 (1)	(M2)	39,4 (6)	40,8 (6)	6,23 (9)	4,46 (7)	0,416 (6)
$\gamma_{20,7}(\text{As})$	1308,95 (13)	0,004 (1)	(E1)	9,12 (13)	9,30 (13)	1,417 (20)	2,22 (4)	12,03 (17)

	Energy (keV)	P _{γ+ce} (%)	Multipolarity	α _K (10 ⁻⁵)	α _L (10 ⁻⁶)	α _M (10 ⁻⁶)	α _T (10 ⁻⁴)	α _π (10 ⁻⁵)
γ _{16,4} (As)	1317,86 (6)	0,006 (1)	(E1)	9,02 (13)	9,19 (13)	1,40 (2)	2,27 (4)	12,61 (18)
γ _(-1,6) (As)	1323,81 (20)	0,007 (1)						
γ _{11,3} (As)	1340,54 (5)	0,069 (2)	(E2)	18,0 (3)	18,5 (3)	2,82 (4)	2,39 (4)	3,76 (6)
γ _{20,6} (As)	1406,04 (11)	0,002 (1)	(M1+E2)					
γ _{11,2} (As)	1422,68 (6)	0,135 (5)	(M1+E2)					
γ _{18,5} (As)	1439,0 (2)	0,002 (1)						
γ _{13,3} (As)	1451,7 (2)	0,006 (2)						
γ _{12,2} (As)	1482,22 (6)	0,022 (1)	(M1+E2)					
γ _{14,2} (As)	1547,50 (11)	0,031 (1)	(M1+E2)					
γ _{15,3} (As)	1670,61 (10)	0,005 (1)	(M1+E2)					
γ _(-1,7) (As)	1738,4 (5)	0,002 (1)						
γ _{15,2} (As)	1752,75 (10)	0,011 (1)	(M1+E2)					
γ _{16,3} (As)	1801,58 (6)	0,019 (5)	(M1+E2)					
γ _(-1,8) (As)	1847,8 (3)	0,008 (1)						
γ _{16,2} (As)	1883,72 (6)	0,030 (2)	(M1+E2)					
γ _(-1,9) (As)	1889,57 (20)	0,003 (1)						
γ _{19,3} (As)	1972,82 (23)	0,001 (1)	(M1+E2)					
γ _{17,2} (As)	2006,2 (4)	0,002 (1)						
γ _(-1,10) (As)	2023,9 (3)	0,002 (1)						
γ _{18,2} (As)	2048,2 (2)	0,001 (1)						
γ _{19,2} (As)	2054,96 (23)	0,003 (1)	(M1+E2)					
γ _{20,2} (As)	2156,18 (11)	0,005 (1)	(E1)	4,13 (6)	4,19 (6)	0,638 (9)	7,85 (11)	73,9 (11)
γ _(-1,11) (As)	2170,5 (3)	0,002 (1)						
γ _{20,1} (As)	2517,05 (11)	0,005 (1)	(M1+E2)					

3 Atomic Data

3.1 As

ω_K	:	0,575	(4)
$\bar{\omega}_L$:	0,0155	(5)
n_{KL}	:	1,232	(4)

3.1.1 X Radiations

	Energy (keV)	Relative probability
X _K		
K α_2	10,50814	51,2
K α_1	10,5438	100
K β_3	11,7204	} 22,8
K β_1	11,7263	
K β_5''	11,821	
K β_2	11,8643	0,86
X _L		
L ℓ	1,12	
L α	1,282	
L η	1,155	
L β	1,317 - 1,388	
L γ	1,524	

3.1.2 Auger Electrons

	Energy (keV)	Relative probability
Auger K		
KLL	8,746 - 9,149	100
KLX	10,114 - 10,541	31,3
KXY	11,460 - 11,862	2,45
Auger L	0,90 - 1,23	416

4 Electron and Positron Emissions

		Energy (keV)	Electrons (per 100 disint.)
e _{AL}	(As)	0,90 - 1,23	65,3 (15)
e _{AK}	(As)		21,0 (8)
	KLL	8,746 - 9,149	}
	KLX	10,114 - 10,541	
	KXY	11,460 - 11,862	
ec _{1,0} T	(As)	55,172 - 67,037	19 (11)
ec _{1,0} K	(As)	55,172 (8)	17 (10)
ec _{1,0} L	(As)	65,513 - 65,716	1,8 (10)
ec _{1,0} M+	(As)	66,836 - 67,037	0,32 (18)
ec _{2,1} T	(As)	349,00 - 360,86	1,27 (30)
ec _{2,1} K	(As)	349,00 (3)	1,13 (25)
ec _{2,1} L	(As)	359,34 - 359,54	0,12 (3)
ec _{2,1} M+	(As)	360,66 - 360,86	0,021 (5)
$\beta_{0,1}^+$	max:	1636 (7)	}
	avg:	745 (3)	
$\beta_{0,2}^+$	max:	1275 (7)	}
	avg:	555 (3)	
$\beta_{0,6}^+$	max:	525 (7)	}
	avg:	228 (3)	
$\beta_{0,7}^+$	max:	428 (7)	}
	avg:	187 (3)	
$\beta_{0,8}^+$	max:	410 (7)	}
	avg:	179 (3)	
$\beta_{0,10}^+$	max:	374 (7)	}
	avg:	164 (3)	

5 Photon Emissions

5.1 X-Ray Emissions

		Energy (keV)	Photons (per 100 disint.)		
XL	(As)	1,12 - 1,524	1,05 (3)		
XK α_2	(As)	10,50814	8,3 (3)	}	K α
XK α_1	(As)	10,5438	16,2 (6)		
XK β_3	(As)	11,7204	3,70 (14)	}	K' β_1
XK β_1	(As)	11,7263			
XK β_5''	(As)	11,821			
XK β_2	(As)	11,8643	0,140 (7)		K' β_2

5.2 Gamma Emissions

	Energy (keV)	Photons (per 100 disint.)
$\gamma_{1,0}(\text{As})$	67,039 (8)	70,7 (70)
$\gamma_{2,1}(\text{As})$	360,866 (23)	96,91 (20)
$\gamma_{2,0}(\text{As})$	427,905 (21)	0,078 (14)
$\gamma_{3,1}(\text{As})$	443,015 (19)	0,050 (3)
$\gamma_{3,0}(\text{As})$	510,053 (17)	0,26 (3)
γ^\pm	511	129 (8)
$\gamma_{11,8}(\text{As})$	557,50 (11)	0,052 (2)
$\gamma_{11,7}(\text{As})$	575,45 (9)	0,146 (7)
$\gamma_{(-1,1)}(\text{As})$	600,3 (3)	0,020 (3)
$\gamma_{5,2}(\text{As})$	609,22 (4)	0,049 (4)
$\gamma_{14,9}(\text{As})$	682,04 (11)	0,019 (2)
$\gamma_{14,7}(\text{As})$	700,27 (13)	0,044 (2)
$\gamma_{7,3}(\text{As})$	765,09 (7)	0,127 (2)
$\gamma_{9,3}(\text{As})$	783,32 (4)	0,058 (2)
$\gamma_{(-1,2)}(\text{As})$	793,0 (5)	0,064 (2)
$\gamma_{11,5}(\text{As})$	813,46 (6)	0,009 (1)
$\gamma_{10,3}(\text{As})$	818,84 (5)	0,036 (2)
$\gamma_{7,2}(\text{As})$	847,22 (7)	0,078 (6)
$\gamma_{11,4}(\text{As})$	856,81 (5)	0,023 (6)
$\gamma_{8,2}(\text{As})$	865,17 (10)	0,50 (2)
$\gamma_{9,2}(\text{As})$	865,45 (3)	0,02 (1)
$\gamma_{12,5}(\text{As})$	872,99 (12)	0,038 (7)
$\gamma_{15,9}(\text{As})$	887,28 (10)	0,011 (8)
$\gamma_{10,2}(\text{As})$	900,97 (5)	0,135 (2)
$\gamma_{4,1}(\text{As})$	926,721 (14)	0,004 (1)
$\gamma_{(-1,3)}(\text{As})$	930,09 (15)	0,005 (1)
$\gamma_{13,4}(\text{As})$	968,0 (2)	0,012 (5)

	Energy (keV)	Photons (per 100 disint.)
$\gamma_{16,10}(\text{As})$	982,73 (8)	0,034 (1)
$\gamma_{4,0}(\text{As})$	993,759 (12)	0,005 (1)
$\gamma_{15,6}(\text{As})$	1002,60 (10)	0,004 (1)
$\gamma_{16,9}(\text{As})$	1018,25 (7)	0,053 (2)
$\gamma_{16,7}(\text{As})$	1036,48 (9)	0,015 (1)
$\gamma_{6,1}(\text{As})$	1111,004 (23)	0,201 (2)
$\gamma_{19,10}(\text{As})$	1153,97 (24)	0,005 (1)
$\gamma_{17,7}(\text{As})$	1159,0 (4)	0,003 (1)
$\gamma_{7,1}(\text{As})$	1208,09 (7)	0,004 (1)
$\gamma_{(-1,4)}(\text{As})$	1215,4 (8)	0,063 (10)
$\gamma_{9,1}(\text{As})$	1226,32 (3)	0,003 (2)
$\gamma_{(-1,5)}(\text{As})$	1249,9 (2)	0,004 (1)
$\gamma_{7,0}(\text{As})$	1275,13 (7)	0,007 (1)
$\gamma_{20,7}(\text{As})$	1308,94 (13)	0,004 (1)
$\gamma_{16,4}(\text{As})$	1317,85 (6)	0,006 (1)
$\gamma_{(-1,6)}(\text{As})$	1323,81 (20)	0,007 (1)
$\gamma_{11,3}(\text{As})$	1340,53 (5)	0,069 (2)
$\gamma_{20,6}(\text{As})$	1406,03 (11)	0,002 (1)
$\gamma_{11,2}(\text{As})$	1422,67 (6)	0,135 (5)
$\gamma_{18,5}(\text{As})$	1439,0 (2)	0,002 (1)
$\gamma_{13,3}(\text{As})$	1451,7 (2)	0,006 (2)
$\gamma_{12,2}(\text{As})$	1482,20 (6)	0,022 (1)
$\gamma_{14,2}(\text{As})$	1547,48 (11)	0,031 (1)
$\gamma_{15,3}(\text{As})$	1670,59 (10)	0,005 (1)
$\gamma_{(-1,7)}(\text{As})$	1738,4 (5)	0,002 (1)
$\gamma_{15,2}(\text{As})$	1752,73 (10)	0,011 (1)
$\gamma_{16,3}(\text{As})$	1801,56 (6)	0,019 (5)
$\gamma_{(-1,8)}(\text{As})$	1847,8 (3)	0,008 (1)
$\gamma_{16,2}(\text{As})$	1883,69 (6)	0,030 (2)
$\gamma_{(-1,9)}(\text{As})$	1889,57 (20)	0,003 (1)
$\gamma_{19,3}(\text{As})$	1972,79 (23)	0,001 (1)
$\gamma_{17,2}(\text{As})$	2006,2 (4)	0,002 (1)
$\gamma_{(-1,10)}(\text{As})$	2023,9 (3)	0,002 (1)
$\gamma_{18,2}(\text{As})$	2048,2 (2)	0,001 (1)
$\gamma_{19,2}(\text{As})$	2054,93 (23)	0,003 (1)
$\gamma_{20,2}(\text{As})$	2156,15 (11)	0,005 (1)
$\gamma_{(-1,11)}(\text{As})$	2170,5 (3)	0,002 (1)
$\gamma_{20,1}(\text{As})$	2517,00 (11)	0,005 (1)

6 Main Production Modes

- { Ge – 70(α ,n)Se – 73
Possible impurities : As – 72, Se – 72, Se – 73m
- { Se – 74(n,2n)Se – 73
Possible impurities : As – 74, Se – 73m
- { Se – 74(γ ,n)Se – 73
Possible impurities : Se – 73m

- { As – 75(p,3n)Se – 73
- { Possible impurities : As – 74, Se – 73m
- { Ge – 72(He – 3,d)Se – 73
- { Possible impurities : Se – 73m
- { Ni – 60(O – 16,p2n)Se – 73
- { Possible impurities : Se – 73m

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