$^{242}_{96}\mathrm{Cm}_{146}$

1 Decay Scheme

Cm-242 decays 100% by alpha transitions to Pu-238 and by spontaneous fission with branching fraction of 6.36 (14) E-6 %.
Le curium 242 se désintègre à 100% par transition alpha vers le plutonium 238 et par fission spontanée pour 6,36 (14) E-06 %.

2 Nuclear Data

$T_{1/2}(^{242}\mathrm{Cm})$	:	162,86	(8)	d
$T_{1/2}(^{238}\mathrm{Pu})$	:	87,74	(3)	a
$Q^{\alpha}(^{242}\mathrm{Cm})$	:	6215,56	(8)	keV

2.1 α Transitions

	Energy keV	Probability × 100	F
$\alpha_{0,15}$	4951,27 (24)	0,00000052 (14)	6
$\alpha_{0,14}$	4986,87 (24)	0,00000055 (15)	10
$\alpha_{0,13}$	5089,77 (19)	0,00000031 (10)	88
$\alpha_{0,12}$	5186,94 (10)	0,0000037 (10)	32
$\alpha_{0,11}$	5197,0 (3)	$\leq$ 0,0000002	$\geq$ 700
$\alpha_{0,10}$	5232,56 (12)	0,0000017 (5)	137
$\alpha_{0,9}$	5252,84 (11)	0,00000113 (21)	278
$\alpha_{0,8}$	5274,13 (12)	0,000035 (7)	12
$\alpha_{0,7}$	5452,34 (15)	$\leq$ 0,00000022	$\geq$ 24000
$\alpha_{0,6}$	5554,28 (14)	0,000013 (3)	1700
$\alpha_{0,5}$	5610,48 (11)	0,00025 (5)	183
$\alpha_{0,4}$	5701,94 (18)	0,00002	7500
$\alpha_{0,3}$	5912,14 (11)	0,0046 (5)	458
$\alpha_{0,2}$	6069,56 (10)	0,034 (2)	390
$\alpha_{0,1}$	6171,48 (9)	25,94 (7)	1,733
$\alpha_{0,0}$	6215,56 (8)	74,06 (7)	1

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce}$ × 100	Multipolarity	α_K	α_L	α_M	α_T
$\gamma_{1,0}$(Pu)	44,08 (3)	26,0 (8)	E2		572 (12)	159,4 (32)	787 (16)
$\gamma_{2,1}$(Pu)	101,92 (4)	0,0388 (22)	E2		10,48 (21)	2,94 (6)	14,45 (21)
$\gamma_{3,2}$(Pu)	157,42 (9)	0,0046 (5)	[E2]	0,193 (4)	1,450 (29)	0,405 (8)	2,19 (4)
$\gamma_{4,3}$(Pu)	210,20 (14)	0,00002052	E2	0,140 (3)	0,415 (8)	0,115 (2)	0,710 (14)
$\gamma_{8,5}$(Pu)	336,36 (15)	0,00000072 (31)	[E1]	0,0257 (5)	0,00502 (10)	0,00122 (2)	0,0323 (6)
$\gamma_{9,5}$(Pu)	357,64 (7)	0,000000055 (11)	M1+E2	0,133 (12)	0,0599 (17)	0,0158 (4)	0,214 (15)
$\gamma_{7,3}$(Pu)	459,8 (2)	0,00000006 (3)					
$\gamma_{6,2}$(Pu)	515,25 (19)	0,0000046 (12)	E1+M2	0,0175 (21)	0,0037 (6)	0,00092 (14)	0,022 (3)
$\gamma_{5,1}$(Pu)	561,02 (10)	0,000152 (40)	E1	0,00929 (18)	0,00169 (3)	0,000407 (8)	0,01153 (23)
$\gamma_{5,0}$(Pu)	605,04 (10)	0,000106 (30)	E1	0,00806 (16)	0,00146 (3)	0,000350 (7)	0,00999 (20)
$\gamma_{6,1}$(Pu)	617,20 (12)	0,0000079 (21)	E1+M2	0,0095 (9)	0,00185 (22)	0,00045 (6)	0,0120 (12)
$\gamma_{7,2}$(Pu)	617,22 (13)	0,00000016					
$\gamma_{10,2}$(Pu)	837,01 (15)	0,00000019 (6)	[E2]	0,01250 (25)	0,00366 (7)	0,000930 (19)	0,0174 (3)
$\gamma_{12,2}$(Pu)	882,63 (3)	0,000000068 (15)	(E2)	0,01141 (23)	0,00321 (6)	0,000811 (16)	0,0157 (3)
$\gamma_{8,1}$(Pu)	897,33 (10)	0,000022 (6)	(E2)	0,01108 (22)	0,00308 (6)	0,000778 (15)	0,0152 (3)
$\gamma_{9,1}$(Pu)	918,7 (2)	0,00000054 (15)	E1	0,00382 (8)	0,000663 (13)	0,000158 (3)	0,00469 (9)
$\gamma_{10,1}$(Pu)	938,91 (10)	0,00000097 (33)	E0+E2				4,4 (4)
$\gamma_{8,0}$(Pu)	941,5 (2)		E0				
$\gamma_{9,0}$(Pu)	962,8 (2)	0,00000053 (15)	E1	0,00352 (7)	0,000609 (12)	0,0001452 (29)	0,00432 (8)
$\gamma_{11,1}$(Pu)	974,5 (3)	0,0000002					
$\gamma_{13,2}$(Pu)	979,8 (2)	0,00000026 (8)					
$\gamma_{10,0}$(Pu)	983,0 (3)	0,00000051 (18)	[E2]	0,00946 (18)	0,00246 (5)	0,000619 (12)	0,01276 (25)
$\gamma_{12,1}$(Pu)	984,5 (1)	0,0000020 (6)	M1+E2	0,00949 (19)	0,00247 (5)	0,000619 (12)	0,01279 (26)
$\gamma_{12,0}$(Pu)	1028,5 (2)	0,0000016 (5)	E2	0,00875 (17)	0,00221 (4)	0,000554 (11)	0,01171 (23)
$\gamma_{13,1}$(Pu)	1081,7 (3)	0,00000005 (2)					
$\gamma_{15,2}$(Pu)	1118,3 (3)	0,00000017 (9)	[E2]	0,00757 (15)	0,00182 (3)	0,000454 (9)	0,01001 (20)
$\gamma_{14,1}$(Pu)	1184,6 (3)	0,00000050 (15)	E2	0,00685 (14)	0,00160 (3)	0,000397 (8)	0,00899 (18)
$\gamma_{15,1}$(Pu)	1220,2 (3)	0,00000035 (11)	E0+E2+(M1)				0,26 (3)
$\gamma_{14,0}$(Pu)	1228,7 (3)		E0				

3 Atomic Data

3.1

ω_K : 0,971 (4)
$\bar{\omega}_L$: 0,521 (20)
n_{KL} : 0,790 (5)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	99,525		63,17
	$K\alpha_1$	103,734		100
	$K\beta_3$	116,244	}	
	$K\beta_1$	117,228	}	
	$K\beta_5''$	117,918	}	36,36
	$K\beta_2$	120,54	}	
	$K\beta_4$	120,969	}	12,61
	$KO_{2,3}$	121,543	}	
X_L				
	$L\ell$	12,12		
	$L\alpha$	14,087 – 14,282		
	$L\eta$	16,333		
	$L\beta$	16,5 – 19,33		
	$L\gamma$	20,71 – 23,07		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	75,2 – 85,3	100
KLX	92,6 – 103,6	60,6
KXY	109,8 – 121,5	9,2
Auger L	6,1 – 22,9	

4 α Emissions

	Energy keV	Probability × 100
$\alpha_{0,15}$	4869,43 (23)	0,00000052 (14)
$\alpha_{0,14}$	4904,44 (23)	0,00000055 (15)
$\alpha_{0,13}$	5005,64 (19)	0,00000031 (10)
$\alpha_{0,12}$	5101,21 (10)	0,0000037 (10)
$\alpha_{0,11}$	5111,1 (3)	$\leq$ 0,0000002
$\alpha_{0,10}$	5146,07 (12)	0,0000017 (5)

	Energy keV	Probability × 100
$\alpha_{0,9}$	5165,95 (16)	0,00000113 (21)
$\alpha_{0,8}$	5186,95 (12)	0,000035 (7)
$\alpha_{0,7}$	5366,22 (15)	≤ 0,00000022
$\alpha_{0,6}$	5462,47 (14)	0,000013 (3)
$\alpha_{0,5}$	5517,75 (11)	0,00025 (5)
$\alpha_{0,4}$	5607,76 (16)	0,00002
$\alpha_{0,3}$	5816,39 (11)	0,0046 (5)
$\alpha_{0,2}$	5969,24 (9)	0,034 (2)
$\alpha_{0,1}$	6069,37 (9)	25,94 (7)
$\alpha_{0,0}$	6112,72 (8)	74,06 (7)

5 Electron Emissions

		Energy keV	Electrons per 100 disint.
e_{AL}	(Pu)	6,1 - 22,9	8,99 (21)
e_{AK}	(Pu)		0,0000082 (15)
	KLL	75,2 - 85,3	}
	KLX	92,6 - 103,6	}
	KXY	109,8 - 121,5	}
$ec_{1,0\ L}$	(Pu)	20,98 - 26,02	18,8 (6)
$ec_{1,0\ M}$	(Pu)	38,15 - 40,31	5,25 (15)
$ec_{2,1\ L}$	(Pu)	78,82 - 83,86	0,0263 (16)
$ec_{2,1\ M}$	(Pu)	95,99 - 98,15	0,0074 (4)
$ec_{3,2\ K}$	(Pu)	25,63 (5)	0,00027 (3)
$ec_{3,2\ L}$	(Pu)	134,32 - 139,36	0,00210 (24)
$ec_{3,2\ M}$	(Pu)	151,49 - 153,65	0,00059 (7)

6 Photon Emissions

6.1 X-Ray Emissions

		Energy keV	Photons per 100 disint.	
XL	(Pu)	12,12 — 23,07	9,92 (23)	
XKα_2	(Pu)	99,525	0,000082 (9)	} Kα
XKα_1	(Pu)	103,734	0,000130 (15)	}

		Energy keV		Photons per 100 disint.	
$XK\beta_3$	(Pu)	116,244	}		
$XK\beta_1$	(Pu)	117,228	}	0,000048 (6)	$K'\beta_1$
$XK\beta_5''$	(Pu)	117,918	}		
$XK\beta_2$	(Pu)	120,54	}		
$XK\beta_4$	(Pu)	120,969	}	0,0000165 (19)	$K'\beta_2$
$XKO_{2,3}$	(Pu)	121,543	}		

6.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{1,0}$(Pu)	44,08 (3)	0,0330 (7)
$\gamma_{2,1}$(Pu)	101,92 (4)	0,00251 (14)
$\gamma_{3,2}$(Pu)	157,42 (9)	0,00145 (16)
$\gamma_{4,3}$(Pu)	210,20 (14)	0,000012
$\gamma_{8,5}$(Pu)	336,36 (15)	0,0000007 (3)
$\gamma_{9,5}$(Pu)	357,64 (7)	0,000000045 (9)
$\gamma_{7,3}$(Pu)	459,8 (2)	0,00000006 (3)
$\gamma_{6,2}$(Pu)	515,25 (19)	0,0000045 (12)
$\gamma_{5,1}$(Pu)	561,02 (10)	0,00015 (4)
$\gamma_{5,0}$(Pu)	605,04 (10)	0,000105 (30)
$\gamma_{6,1}$(Pu)	617,20 (12)	0,0000079 (21)
$\gamma_{7,2}$(Pu)	617,22 (13)	0,00000016
$\gamma_{10,2}$(Pu)	837,01 (15)	0,00000019 (6)
$\gamma_{12,2}$(Pu)	882,63 (3)	0,000000067 (15)
$\gamma_{8,1}$(Pu)	897,33 (10)	0,000022 (6)
$\gamma_{9,1}$(Pu)	918,7 (2)	0,00000054 (15)
$\gamma_{10,1}$(Pu)	938,91 (10)	0,00000018 (6)
$\gamma_{9,0}$(Pu)	962,8 (2)	0,00000053 (15)
$\gamma_{11,1}$(Pu)	974,5 (3)	0,0000002
$\gamma_{13,2}$(Pu)	979,8 (2)	0,00000026 (8)
$\gamma_{10,0}$(Pu)	983,0 (3)	0,00000050 (18)
$\gamma_{12,1}$(Pu)	984,5 (1)	0,0000020 (6)
$\gamma_{12,0}$(Pu)	1028,5 (2)	0,0000016 (5)
$\gamma_{13,1}$(Pu)	1081,7 (3)	0,00000005 (2)
$\gamma_{15,2}$(Pu)	1118,3 (3)	0,00000017 (9)
$\gamma_{14,1}$(Pu)	1184,6 (3)	0,00000050 (15)
$\gamma_{15,1}$(Pu)	1220,2 (3)	0,00000028 (9)

7 Main Production Modes

$Am - 241(n,\gamma)Am - 242$

$\left\{ \begin{array}{l} \mathrm{Am}-242(\beta^-)\mathrm{Cm}-242 \\ \text{Possible impurities : } \mathrm{Am}-241,\mathrm{Cm}-243,\mathrm{Cm}-244 \end{array} \right.$

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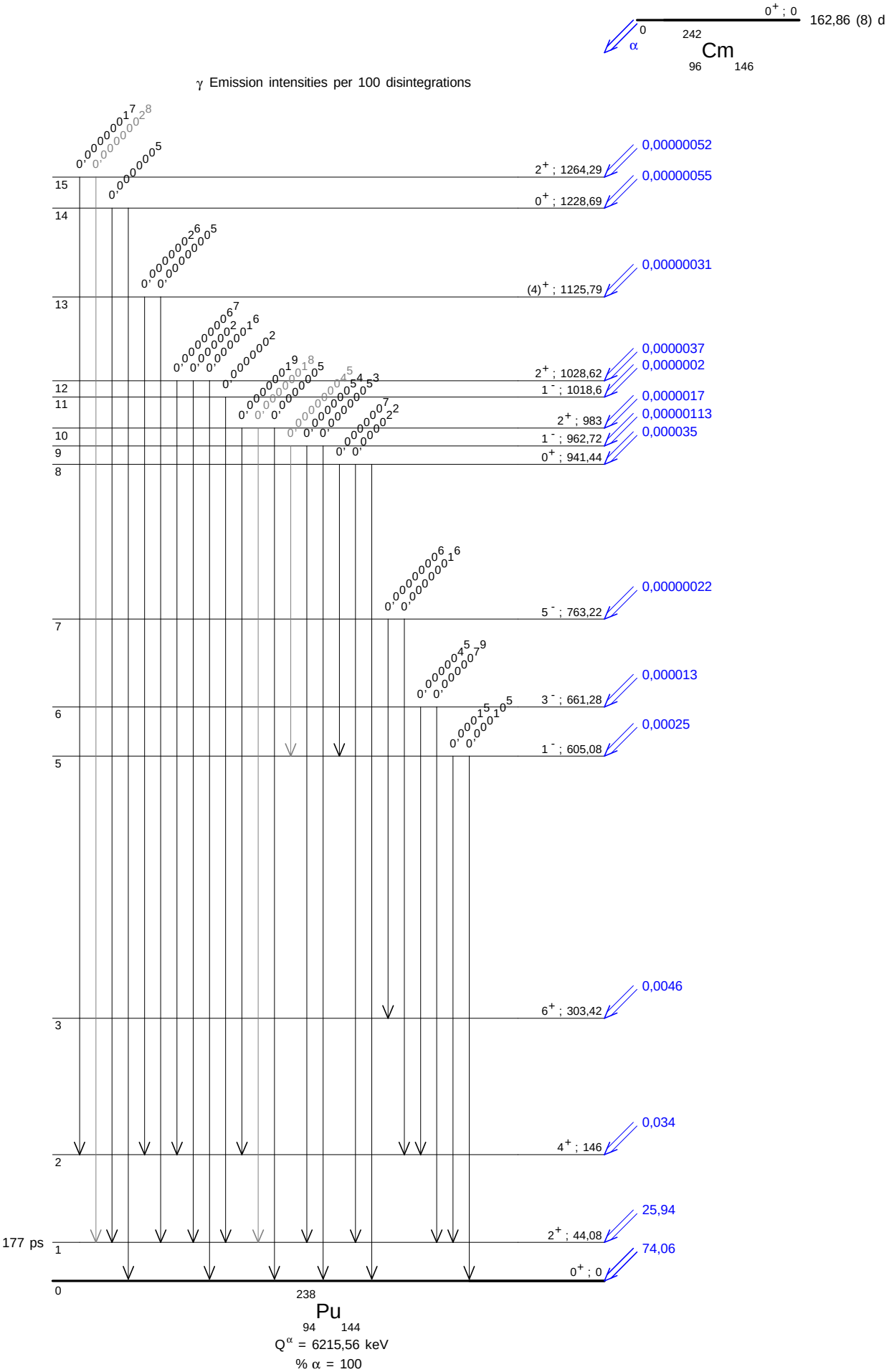
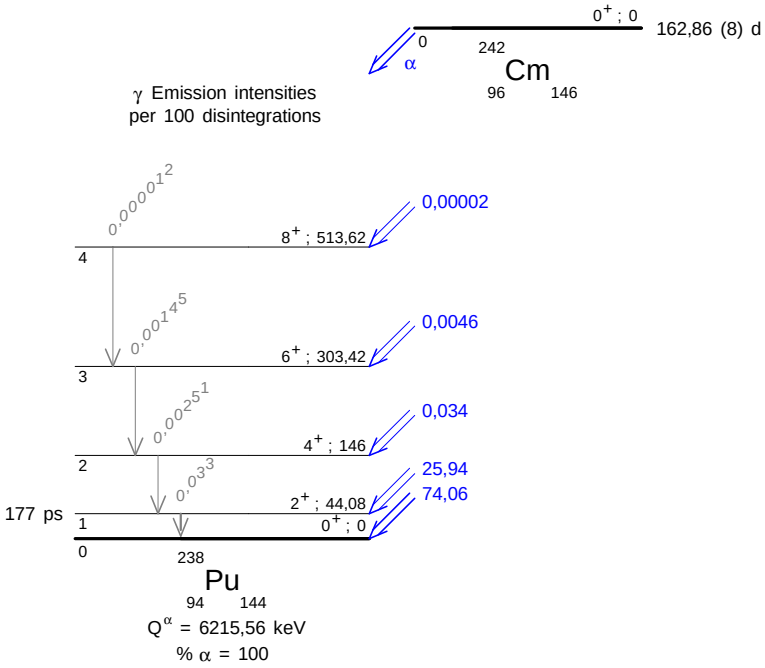
$^{242}_{96}Cm_{146}$


0+ ; 0
162,86 (8) d
0
α
242
Cm
96
146
γ Emission intensities per 100 disintegrations
2+ ; 1264,29
0,00000052
0+ ; 1228,69
0,00000055
(4)+ ; 1125,79
0,00000031
2+ ; 1028,62
0,0000037
1- ; 1018,6
0,0000002
2+ ; 983
0,0000017
1- ; 962,72
0,00000113
0+ ; 941,44
0,000035
5- ; 763,22
0,00000022
3- ; 661,28
0,000013
1- ; 605,08
0,00025
6+ ; 303,42
0,0046
4+ ; 146
0,034
2+ ; 44,08
25,94
0+ ; 0
74,06
177 ps
238
Pu
94
144
Q^α = 6215,56 keV
% α = 100


0+ ; 0
162,86 (8) d
0
α
242
Cm
96
146
γ Emission intensities
per 100 disintegrations
0,00002
8+ ; 513,62
4
0,0046
6+ ; 303,42
3
0,034
4+ ; 146
2
25,94
74,06
2+ ; 44,08
177 ps
1
0+ ; 0
0
238
Pu
94
144
Q^α = 6215,56 keV
% α = 100