$^{243}_{95}\mathrm{Am}_{148}$

1 Decay Scheme

Am-243 decays by emission of alpha particles to Np-239, with a minute branch of 3.8 (7) 10^{-9} % by spontaneous fission.
L'américium 243 se désintègre par émission alpha vers le neptunium 239. Un faible branchement (3,8 (7) 10^{-9} %) par fission spontanée existe.

2 Nuclear Data

$T_{1/2}(^{243}\mathrm{Am})$	:	7367	(23)	a
$T_{1/2}(^{239}\mathrm{Np})$	:	2,356	(3)	d
$Q^{\alpha}(^{243}\mathrm{Am})$	:	5438,8	(10)	keV

2.1 α Transitions

	Energy keV	Probability × 100	F
$\alpha_{0,16}$	4774 (3)	0,0017 (5)	7,2
$\alpha_{0,15}$	5001 (3)	0,000085	5400
$\alpha_{0,14}$	5013 (3)	0,00018	3000
$\alpha_{0,13}$	5029 (3)	0,00034	2000
$\alpha_{0,12}$	5081 (3)	0,0009 (4)	900
$\alpha_{0,11}$	5092 (3)	0,0009 (4)	
$\alpha_{0,10}$	5113 (3)	0,0020 (6)	700
$\alpha_{0,9}$	5119 (3)	0,0020 (6)	
$\alpha_{0,8}$	5173 (5)	0,0055 (6)	1100
$\alpha_{0,7}$	5199 (1)	0,010 (1)	900
$\alpha_{0,6}$	5268 (1)	1,383 (7)	17,7
$\alpha_{0,4}$	5320,9 (10)	11,46 (5)	4,71
$\alpha_{0,3}$	5363,6 (10)	86,74 (5)	1,14
$\alpha_{0,1}$	5410 (1)	0,192 (3)	95
$\alpha_{0,0}$	5438,9 (23)	0,240 (3)	1120

2.2 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce} \times 100$	Multipolarity	α_K	α_L	α_M	α_T
$\gamma_{1,0}$(Np)	31,130 (21)	12,7 (30)	M1+3,08%E2		195 (10)	50 (3)	263 (13)
$\gamma_{4,3}$(Np)	43,2	10,1	M1+12,6%E2		114 (13)	30 (4)	154 (18)
$\gamma_{3,1}$(Np)	43,53 (2)	12,62 (23)	E1		0,856 (12)	0,215 (3)	1,143 (16)
$\gamma_{6,5}$(Np)	50,6 (10)	0,011 (2)	(E1)		0,58 (4)	0,144 (9)	0,77 (5)
$\gamma_{6,4}$(Np)	55,18 (5)	1,81 (26)	M1+26,4%E2		78 (10)	21 (3)	107 (14)
$\gamma_{3,0}$(Np)	74,66 (2)	85,7 (16)	E1		0,207 (3)	0,0512 (8)	0,276 (4)
$\gamma_{4,1}$(Np)	86,71 (2)	0,41 (1)	E1		0,1401 (20)	0,0345 (5)	0,186 (3)
$\gamma_{6,3}$(Np)	98,360 (44)	0,25 (4)	(E2)		11,31 (20)	3,15 (6)	15,6 (3)
$\gamma_{4,0}$(Np)	117,84 (15)	0,62 (5)	E1		0,0634 (10)	0,01551 (23)	0,0842 (13)
$\gamma_{6,1}$(Np)	141,90 (6)	0,141 (10)	E1	0,1723 (25)	0,0391 (6)	0,00955 (14)	0,224 (4)
$\gamma_{7,2}$(Np)	169	0,0014	(E1)	0,1156 (23)	0,0251 (6)	0,00612 (13)	0,149 (3)
$\gamma_{9,5}$(Np)	195,0 (18)	0,001	(E1)	0,0833 (22)	0,0176 (5)	0,00428 (12)	0,107 (3)

3 Atomic Data

3.1 Np

ω_K : 0,971 (4)
$\bar{\omega}_L$: 0,511 (20)
n_{KL} : 0,791 (5)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	97,069		62,82
	$K\alpha_1$	101,059		100
	$K\beta_3$	113,303	}	
	$K\beta_1$	114,234	}	
	$K\beta_5''$	114,912	}	36,21
	$K\beta_2$	117,463	}	
	$K\beta_4$	117,876	}	12,47
	$KO_{2,3}$	118,429	}	
X_L				
	$L\ell$	11,871		
	$L\alpha$	13,671 – 13,946		
	$L\eta$	15,861		
	$L\beta$	16,109 – 17,992		
	$L\gamma$	20,784 – 21,491		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	73,501 – 83,134	100
KLX	90,358 – 101,054	60,2
KXY	107,19 – 118,66	9,06
Auger L	6,04 – 13,52	

4 α Emissions

	Energy keV	Probability × 100
$\alpha_{0,16}$	4695 (3)	0,0017 (5)
$\alpha_{0,15}$	4919 (3)	0,000085
$\alpha_{0,14}$	4930 (3)	0,00018
$\alpha_{0,13}$	4946 (3)	0,00034
$\alpha_{0,12}$	4997 (3)	0,0009 (4)
$\alpha_{0,11}$	5008 (3)	0,0009 (4)
$\alpha_{0,10}$	5029 (3)	0,0020 (6)
$\alpha_{0,9}$	5035 (3)	0,0020 (6)
$\alpha_{0,8}$	5088 (5)	0,0055 (6)
$\alpha_{0,7}$	5113 (1)	0,010 (1)
$\alpha_{0,6}$	5181 (1)	1,383 (7)
$\alpha_{0,4}$	5233,3 (10)	11,46 (5)
$\alpha_{0,3}$	5275,3 (10)	86,74 (5)
$\alpha_{0,1}$	5321 (1)	0,192 (3)
$\alpha_{0,0}$	5349,4 (23)	0,240 (3)

5 Electron Emissions

		Energy keV	Electrons per 100 disint.
e_{AL}	(Np)	6,04 - 13,52	18,4 (11)
e_{AK}	(Np)		0,00058 (9)
	KLL	73,501 - 83,134 }	
	KLX	90,358 - 101,054 }	
	KXY	107,19 - 118,66 }	

		Energy keV	Electrons per 100 disint.
$ec_{1,0\ L}$	(Np)	8,70 - 13,52	9,4 (22)
$ec_{4,3\ L}$	(Np)	20,8 - 25,6	7,4 (8)
$ec_{3,1\ L}$	(Np)	21,10 - 25,92	5,04 (11)
$ec_{1,0\ M}$	(Np)	25,39 - 27,47	2,4 (6)
$ec_{1,0\ N}$	(Np)	29,63 - 30,73	0,65 (15)
$ec_{6,4\ L}$	(Np)	32,753 - 37,570	1,10 (33)
$ec_{4,3\ M}$	(Np)	37,5 - 39,5	1,95 (26)
$ec_{3,1\ M}$	(Np)	37,79 - 39,87	1,266 (28)
$ec_{4,3\ N}$	(Np)	41,7 - 42,8	0,53 (6)
$ec_{3,1\ N}$	(Np)	42,03 - 43,13	0,336 (7)
$ec_{6,4\ M}$	(Np)	49,441 - 51,516	0,30 (9)
$ec_{3,0\ L}$	(Np)	52,23 - 57,05	13,91 (32)
$ec_{6,4\ N}$	(Np)	53,679 - 54,777	0,08 (2)
$ec_{3,0\ M}$	(Np)	68,92 - 71,00	3,44 (8)
$ec_{3,0\ N}$	(Np)	73,16 - 74,26	0,917 (21)
$ec_{6,3\ L}$	(Np)	76,073 - 80,890	0,17 (2)
$ec_{6,3\ M}$	(Np)	92,761 - 94,836	0,05 (1)

6 Photon Emissions

6.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(Np)	11,871 — 21,491		18,9 (7)	
$XK\alpha_2$	(Np)	97,069		0,0058 (4)	} Kα
$XK\alpha_1$	(Np)	101,059		0,0092 (7)	}
$XK\beta_3$	(Np)	113,303	}		
$XK\beta_1$	(Np)	114,234	}	0,00335 (25)	$K'\beta_1$
$XK\beta_5''$	(Np)	114,912	}		
$XK\beta_2$	(Np)	117,463	}		
$XK\beta_4$	(Np)	117,876	}	0,00115 (9)	$K'\beta_2$
$XKO_{2,3}$	(Np)	118,429	}		

6.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{1,0}$(Np)	31,14 (3)	0,048 (11)
$\gamma_{4,3}$(Np)	43,1	0,065
$\gamma_{3,1}$(Np)	43,53 (2)	5,89 (10)
$\gamma_{6,5}$(Np)	50,6 (10)	0,0062 (10)
$\gamma_{6,4}$(Np)	55,18 (5)	0,0168 (11)
$\gamma_{3,0}$(Np)	74,66 (2)	67,2 (12)
$\gamma_{4,1}$(Np)	86,71 (2)	0,346 (9)
$\gamma_{6,3}$(Np)	98,5 (2)	0,0151 (21)
$\gamma_{4,0}$(Np)	117,60 (15)	0,57 (5)
$\gamma_{6,1}$(Np)	141,90 (6)	0,115 (8)
$\gamma_{7,2}$(Np)	169	0,0012
$\gamma_{9,5}$(Np)	195,0 (18)	0,00085

7 Main Production Modes

Pu − 239(mult. n capture)
U − 238(mult. n capture)

8 References

- M.-M.Bé, V. Chisté, C. Dulieu, E. Browne, V. Chechev, N. Kuzmenko, R. Helmer, A. Nichols, E. Schönfeld, R. Dersch.. Monographie BIPM-5, ISBN 92-822-2207-1 ()
  (Am-241 half-life)
- F. Stephens, J. Hummel, F. Asaro. Phys. Rev. 98 (1955) 261
  (Am-243 alpha-particle emission probabilities.)
- J.P. Hummel. Thesis. Univ. of California - UCRL-3456 (1956)
  (Am-243 alpha-particle emission probabilities.)
- R.F. Barnes, D.J. Henderson, A.L. Harkness, H. Diamond. J. Inorg. Nucl. Chem. 9 (1959) 105
  (Am-243 half-life.)
- F. Asaro, F.S. Stephens, J.M. Hollander, I. Perlman. Phys. Rev. 117 (1960) 492
  (Am-243 gamma-ray emission probabilities.)
- A.B. Beadle, D.F. Dance, K.M. Glover, J. Milsted. J. Inorg. Nucl. Chem. 12 (1960) 359
  (Am-243 half-life.)
- S.A. Baranov, V.M. Kulakov, V.M. Shatinsky. Nucl. Phys. 56 (1964) 252
  (Am-243 alpha-particle energies and emission probab)
- C.M. Lederer, J.K. Poggenburg, F. Asaro, J.O. Rasmussen, I. Perlman. Nucl. Phys. 84 (1966) 481
  (Am-243 alpha-particle emission probabilities.)
- B.A. Gvozdev, B.B. Zakhvataev, V.I. Kuznetsov, V.P. Perelygin, S.V. Pirozkov, E.G. Chudinov, I.K. Shvetsov. Sov. Radiochem. 8 (1966) 459
  (Spontaneous fission branching)
- S.A. Baranov, V.M. Kulakov, V.M. Shatinskii. Sov. J. Nucl. Phys. 7 (1968) 442
  (Am-243 alpha-particle energies.)
- G. Berzins, M.E. Bunker, J.W. Starner. Nucl. Phys. A114 (1968) 512
  (Am-243 half-life.)
- J.R. Van Hise, D. Engelkemeir. Phys. Rev. 171 (1968) 1325
  (Am-243 gamma-ray energies and emission probabilities.)

- D. Engelkemeir. Phys. Rev. 181 (1969) 1675
  (Am-243 gamma-ray energies.)
- B.M. Aleksandrov, O.I. Grigorev, N.S. Shimanskaya. Soviet J. Nucl. Phys. 10 (1970) 8
  (Am-243 gamma-ray emission probabilities.)
- I. Ahmad, M. Wahlgren. Nucl. Instrum. Methods 99 (1972) 333
  (Am-243 gamma-ray emission probabilities.)
- V.G. Polyukov, G.A. Timofeev, P.A. Privalova, V.Y. Gabeskiriya, A.P. Chetverikov. Sov. At. Energ. 37 (1975) 1103
  (Am-243 half-life.)
- J.C. Pate, K.R. Baker, R.W. Fink, D.A. McClure, N.S. Kendrick Jr.. Z. Phys. A272 (1975) 169
  (Am-243 gamma-ray energies and emission probabilities.)
- D.I. Starozhukov, Y.S. Popov, P.A. Privalova. Sov. At. Energy 42 (1977) 355
  (Am-243 gamma-ray emission probabilities.)
- F.P. Larkins. At. Data Nucl. Data Tables 20 (1977) 311
  (Atomic electron binding energies.)
- F. Rösel, H.M. Fries, K. Alder, H.C. Pauli. At. Data Nucl. Data Tables 21 (1978) 92
  (gamma-ray theoretical internal conversion coefficients.)
- Y.S. Popov, D.I. Starozhukov, V.B. Mishenev, P.A. Privalova, A.I. Mishchenko. Sov. At. Energy 46 (1979) 123
  (Am-243 gamma-ray emission probabilities.)
- S.K. Aggarwal, A.R. Parab, H.C. Jain. Phys. Rev. C22 (1980) 767
  (Am-243 half-life.)
- I. Ahmad. Nucl. Instrum. Methods 193 (1982) 9
  (Am-243 gamma-ray energies and emission probabilities.)
- R. Vaninbroukx, G. Bortels, B. Denecke. Int. J. Appl. Radiat. Isotop. 35 (1984) 1081
  (Am-243 gamma-ray emission probabilities.)
- W.L. Zijp. Report ECN FYS/RASA-85/19 (1985)
  (Discrepant Data - Limited Relative Statistical Weight Method.)
- A. Lorenz. IAEA Tech. Rept. Ser. 261 (1986)
  (Am-243 recommended half-life.)
- E. Browne. Nucl. Instrum. Methods Phys. Res. A265 (1988) 541
  (Uncertainties in alpha-particle emission probabilities.)
- W. Bambynek, T. Barta, R. Jedlovszky, P. Christmas, N. Coursol, K. Debertin, R.G. Helmer, A.L. Nichols, F.J. Schima, Y. Yoshizawa. IAEA-TECDOC-619 (1991)
  (Am-243 recommended half-life.)
- A. Rytz. At. Data Nucl. Data Tables 47 (1991) 205
  (Am-243 alpha-particle energies.)
- E. Garcia-Torano, M.L. Acena, G. Bortels, D. Mouchel. Nucl. Instrum. Methods Phys. Res. A312 (1992) 317
  (Am-243 alpha-particle energies and emission probabilities.)
- Y.A. Akovali. Nucl. Data Sheets 66 (1992) 897
  (Am-243 recommended half-life.)
- E. Schönfeld, H. Janssen. Nucl. Instrum. Methods. Phys. Res. A369 (1996) 527
  (Atomic data, X-rays, Auger electrons.)
- D. Sardari, T.D. Mac Mahon, S.P. Holloway. Nucl. Instrum. Methods Phys. Res. A369 (1996) 486
  (Am-243 gamma-ray energies and emission probabilities.)
- S.A. Woods, D.H. Woods, M.J. Woods, S.M. Jerome, M. Burke, N.E. Bowles, S.E.M. Lucas, C. Paton. Nucl. Instrum. Methods Phys. Res. A369 (1996) 472
  (Am-243 gamma-ray emission probabilities.)
- A.M. Sanchez, P.R. Montero, F.V. Tome. Nucl. Instrum. Methods Phys. Res. A369 (1996) 593
  (Am-243 alpha-particle energies and emission probabilities.)
- E.Schönfeld, G. Rodloff. Report PTB-6.11-98-1, Braunschweig (1998)
  (Auger electron energies.)
- Y.A. Akovali. Nucl. Data Sheets 84 (1998) 1
  (Alpha decay. Radius parameter of even-even nuclei.)
- Jichun Yang, Jianzhong Ni. Nucl. Instrum. Methods Phys. Res. A413 (1998) 239
  (Alpha emission intensities)
- E. Schönfeld, H. Janssen. Applied Radiation Isotopes 52 (2000) 595
  (X-ray and Auger electron emission probabilities.)

- F. Dayras. Nucl. Instrum. Methods Phys. Res. A490 (2002) 492
(Am-243 alpha-particle energies and emission probabilities.)
- R. Sampathkumar, P.C. Kalsi, A. Ramaswami. J. Radioanal. Nucl. Chem. 253 (2002) 523
(Am-243 spontaneous fission branching.)
- G. Audi, A.H. Wapstra, C. Thibault. Nucl. Phys. A729 (2003) 337
(2003 Atomic Mass Adjustment.)
- E. Browne. Nucl. Data Sheets 98 (2003) 665
(Evaluated data (ENSDF for nuclei with A=239))
- S.K. Aggarwal, et al.. Nucl. Instrum. Methods Phys. Res. A571 (2007) 663
(Am-243 half-life.)
- T. Kibedi, T.W. Burrows, M.B. Trzhaskovskaya, P.M. Davidson, and C.W.Nestor, Jr. Nucl. Instrum. Methods Phys. Res. A589 (2008) 202
(Theoretical Internal Conversion Coefficients)

$^{243}_{95}Am_{148}$

γ Emission intensities per 100 disintegrations