$^{236m}_{93}\mathrm{Np}_{143}$

1 Decay Scheme

Np-236m (isomer state of Np-236, J=1, E1 =60 keV) decays 53(1) % by electron capture to U-236 and 47(1) % by beta minus emission to Pu-236.
Le neptunium 236 isomère se désintègre par capture électronique (53%) vers l'uranium 236 et par transition bêta moins vers le plutonium 236.

2 Nuclear Data

$T_{1/2}(^{236m}\mathrm{Np})$	:	22,5	(4)	h
$T_{1/2}(^{236}\mathrm{U})$	:	23,43	(6)	10^6 a
$T_{1/2}(^{236}\mathrm{Pu})$	:	2,87	(1)	a
$Q^-(^{236m}\mathrm{Np})$	:	537	(8)	keV
$Q^+(^{236m}\mathrm{Np})$	:	993	(13)	keV

2.1 Electron Capture Transitions

	Energy keV	Probability × 100	Nature	lg ft	P_K	P_L	P_{M+}
$\epsilon_{0,4}$	306 (13)	1,64 (9)	1st forbidden	7,3	0,621 (10)	0,274 (7)	0,105 (3)
$\epsilon_{0,1}$	948 (13)	8,3 (30)	allowed	7,8	0,751 (1)	0,184 (1)	0,0652 (1)
$\epsilon_{0,0}$	993 (13)	43,1 (32)	allowed	7,1	0,753 (1)	0,182 (1)	0,0646 (1)

2.2 β^- Transitions

	Energy keV	Probability × 100	Nature	lg ft
$\beta^-_{0,1}$	492 (8)	11 (4)	allowed	7,2
$\beta^-_{0,0}$	537 (8)	36 (4)	allowed	6,8

2.3 Gamma Transitions and Internal Conversion Coefficients

	Energy keV	$P_{\gamma+ce} \times 100$	Multipolarity	α_K	α_L	α_M	α_T
$\gamma_{1,0}$(Pu)	44,63 (10)	11,2 (37)	E2		540 (11)	151 (3)	743 (15)
$\gamma_{1,0}$(U)	45,242 (3)	9,6 (30)	E2		429 (9)	118,6 (24)	589 (12)
$\gamma_{2,1}$(U)	104,234 (15)	0,0143 (17)	E2		8,00 (16)	2,22 (5)	11,0 (2)
$\gamma_{4,2}$(U)	538,11 (10)	0,0143 (17)	E3	0,0622 (13)	0,0587 (12)	0,0160 (4)	0,143 (3)
$\gamma_{4,1}$(U)	642,35 (9)	1,24 (8)	E1+(M2+E3)	0,112 (10)	0,031 (3)	0,0080 (8)	0,15 (2)
$\gamma_{4,0}$(U)	687,60 (5)	0,383 (28)	E1	0,219 (12)	0,068 (6)	0,018 (2)	0,31 (2)

3 Atomic Data

3.1 U

ω_K : 0,970 (4)
$\bar{\omega}_L$: 0,500 (19)
$\bar{\omega}_M$: 0,050 (5)
n_{KL} : 0,794 (5)

3.1.1 X Radiations

		Energy keV		Relative probability
X_K				
	$K\alpha_2$	94,666		62,47
	$K\alpha_1$	98,44		100
	$K\beta_3$	110,421	}	
	$K\beta_1$	111,298	}	
	$K\beta_5''$	111,964	}	36,08
	$K\beta_2$	114,407	}	
	$K\beta_4$	115,012	}	12,34
	$KO_{2,3}$	115,377	}	
X_L				
	$L\ell$	11,618		
	$L\alpha$	13,438 – 13,614		
	$L\eta$	15,399		
	$L\beta$	15,726 – 18,206		
	$L\gamma$	19,507 – 20,714		

3.1.2 Auger Electrons

	Energy keV	Relative probability
Auger K		
KLL	71,776 – 80,954	100
KLX	88,153 – 98,429	59,6
KXY	104,51 – 115,59	8,88
Auger L	6,4 – 21,6	

3.2 Pu

ω_K : 0,971 (4)
$\bar{\omega}_L$: 0,521 (20)
$\bar{\omega}_M$: 0,555 (5)
n_{KL} : 0,790 (5)

4 Electron Emissions

		Energy keV	Electrons per 100 disint.
e_{AL}	(U)	6,4 - 21,6	21,7 (15)
e_{AK}	(U)		1,03 (17)
	KLL	71,776 - 80,954 }	
	KLX	88,153 - 98,429 }	
	KXY	104,51 - 115,59 }	
e_{AL}	(Pu)	6,6 - 23,0	3,8 (14)
$ec_{1,0\ L}$	(Pu)	21,53 - 26,57	8 (3)
$ec_{1,0\ L}$	(U)	23,484 - 28,074	6,9 (22)
$ec_{1,0\ M}$	(Pu)	38,70 - 40,86	2,2 (8)
$ec_{1,0\ M}$	(U)	39,694 - 41,690	1,9 (6)
$ec_{4,1\ K}$	(U)	526,75 (9)	0,121 (13)
$ec_{4,0\ K}$	(U)	572,00 (5)	0,064 (6)
$\beta^-_{0,1}$	max:	492 (8)	11 (4)
$\beta^-_{0,1}$	avg:	143 (3)	
$\beta^-_{0,0}$	max:	537 (8)	36 (4)
$\beta^-_{0,0}$	avg:	158 (3)	

5 Photon Emissions

5.1 X-Ray Emissions

		Energy keV		Photons per 100 disint.	
XL	(U)	11,618 — 20,714		21,3 (18)	
XKα_2	(U)	94,666		9,9 (10)	} Kα
XKα_1	(U)	98,44		15,8 (15)	}
XKβ_3	(U)	110,421	}		
XKβ_1	(U)	111,298	}	5,7 (6)	K$'\beta_1$
XKβ''_5	(U)	111,964	}		
XKβ_2	(U)	114,407	}		
XKβ_4	(U)	115,012	}	1,95 (15)	K$'\beta_2$
XKO$_{2,3}$	(U)	115,377	}		
XL	(Pu)	12,124 — 21,984		4,2 (16)	

5.2 Gamma Emissions

	Energy keV	Photons per 100 disint.
$\gamma_{1,0}$(Pu)	44,63 (10)	0,015 (5)
$\gamma_{1,0}$(U)	45,242 (3)	0,016 (5)
$\gamma_{2,1}$(U)	104,234 (6)	0,00119 (14)
$\gamma^{\pm}$	511	
$\gamma_{4,2}$(U)	538,11 (10)	0,0125 (15)
$\gamma_{4,1}$(U)	642,35 (9)	1,08 (6)
$\gamma_{4,0}$(U)	687,60 (5)	0,292 (21)

6 Main Production Modes

U − 235(d,n)Np − 236m

U − 235(α,p,2n)Np − 236m

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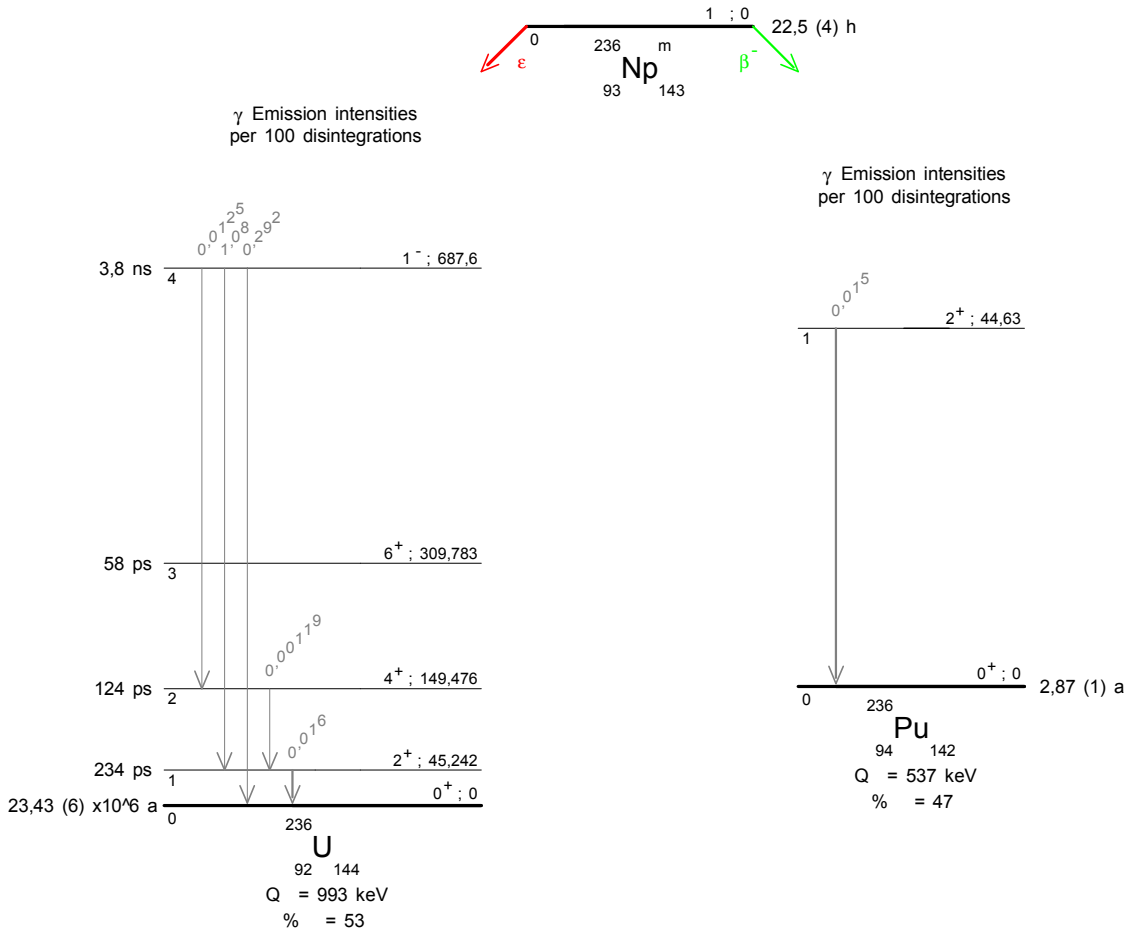
1 ; 0
22,5 (4) h
0
236 m
Np
93 143
ε
β⁻
γ Emission intensities
per 100 disintegrations
3,8 ns
4
1⁻ ; 687,6
58 ps
3
6⁺ ; 309,783
124 ps
2
4⁺ ; 149,476
234 ps
1
2⁺ ; 45,242
23,43 (6) x10^6 a
0
0⁺ ; 0
236
U
92 144
Q = 993 keV
% = 53
γ Emission intensities
per 100 disintegrations
1
2⁺ ; 44,63
0
0⁺ ; 0
2,87 (1) a
236
Pu
94 142
Q = 537 keV
% = 47