^{236}Np ε decay (155×10^3 y) 1983Ah02,1981Li30

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Shaofei Zhu	NDS 182, 2 (2022).	1-Apr-2022

Parent: ^{236}Np: E=0; $J^\pi=6^{(-)}$; $T_{1/2}=1.55\times10^5$ y *1*; Q(ε)=9.3×10^2 *5*; %ε decay=87.8 *2*

^{236}Np-Q(ε): From 2021Wa16.

^{236}Np-%ε decay: From ^{236}Np Adopted Levels.

1983Ah02: Activity from ^{238}U(d,4n), E=21 MeV, chemically purified from other reaction products. Measured γ, ce, K x ray, γγ.

1981Li30: Activity from ^{235}U(d,n), E=16 MeV, chemically purified from other reaction products. Measured α, γ, γγ, ce, mass-spectrometric measurement for ^{235}U/^{236}U ratio to determine $T_{1/2}$.

Relative to Iγ(160.3γ)=100, the measured x-ray intensities: I(Kα$_1$)=99 *3*; I(Kα$_2$)=61 *2*; I(Kβ$_1$)+I(Kβ$_3$)+I(Kβ$_5$)=38 *2*; I(Kβ$_2$)+I(Kβ$_4$)=13.1 *7* (1983Ah02).

Decay scheme beyond 309.79-keV, 6$^+$ state from 1981Li30.

α: Additional information 1.

^{236}U Levels

E(level)†	Jπ‡	$T_{1/2}$‡	Comments
0	0$^+$	2.342×10^7 y *4*	
45.243 *3*	2$^+$		
149.480 *5*	4$^+$		
309.788 *6*	6$^+$		
687.55 *4*	1$^-$	3.78 ns *9*	E(level): populated from the decay of 848-keV level fed by ε (1981Li30).
744.2 *8*	3$^-$		E(level): populated from the decay of 848-keV level fed by ε (1981Li30).
847.6 *13*	5$^-$		E(level): assuming the observed 642.4γ and 687.6γ are from the decay of this level fed by ε (1981Li30).

† From a least-squares fit to γ-ray energies.

‡ From Adopted Levels.

ε radiations

E(decay)	E(level)	Iε†‡	Log *ft*	Comments
(8×10^1 *5*)	847.6	0.100 *10*	14.5 *12*	εL=0.6 *4*; εM+=0.4 *4* Iε: from 1981Li30.
(6.2×10^2 *5*)	309.788	87 *4*	14.1 *1*	εK=0.726 *8*; εL=0.201 *5*; εM+=0.0729 *22* Log *ft*: the large value for log *ft* is the result of high K-hindrance.

† From intensity balances.

‡ Absolute intensity per 100 decays.

γ(^{236}U)

Normalization factor=0.316 *10* from Iγ(160.3γ)=36 *1* per 100 ε decay (1983Ah02) and ε branching=0.878 *2*.

Eγ‡	Iγ†#	Ei(level)	J_i^π	Ef	J_f^π	Mult.‡	α	Comments
45.243 *2*	0.4 *1*	45.243	2$^+$	0	0$^+$	E2	589 *8*	α(L)=429 *6*; α(M)=118.6 *17*; α(N)=32.1 *5*; α(O)=7.36 *10*; α(P)=1.191 *17*; α(Q)=0.00285 *4* Iγ: from 1983Ah02.
(56.6 *8*)	0.0016	744.2	3$^-$	687.55	1$^-$	[E2]	199 *14*	α(L)=145 *11*; α(M)=40.1 *29*; α(N)=10.9 *8*; α(O)=2.50

Continued on next page (footnotes at end of table)

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γ(^{236}U) (continued)

E_γ[‡]	I_γ[†#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α	Comments
								18; α(P)=0.405 *29*; α(Q)=0.00107 *7* I_γ: deduced from I(γ+ce) balance (1981Li30).
(103.4)	0.0254	847.6	5$^-$	744.2	3$^-$	(E2)	11.41 *16*	α(L)=8.31 *12*; α(M)=2.305 *32*; α(N)=0.626 *9*; α(O)=0.1438 *20*; α(P)=0.02355 *33* α(Q)=9.69×10^{-5} *14* I_γ: deduced from I(γ+ce) balance with Iε=0.1% (1981Li30).
104.237 *4*	23 *1*	149.480	4$^+$	45.243	2$^+$	E2	10.99 *15*	α(L)=8.00 *11*; α(M)=2.220 *31*; α(N)=0.603 *8*; α(O)=0.1385 *19*; α(P)=0.02268 *32* α(Q)=9.41×10^{-5} *13* E_γ,I_γ: from 1983Ah02; Mult.: from α(exp)=12 *1* and (L1+L2)/L3≈2 (1983Ah02).
160.308 *3*	100 *4*	309.788	6$^+$	149.480	4$^+$	E2	1.761 *25*	α(K)=0.2079 *29*; α(L)=1.132 *16*; α(M)=0.313 *4*; α(N)=0.0850 *12*; α(O)=0.01958 *27* α(P)=0.00325 *5*; α(Q)=2.327×10^{-5} *33* Mult.: from α(exp)=1.8 *2* and (L1+L2)/L3≈2 (1983Ah02).
538.09 *7*	0.001	687.55	1$^-$	149.480	4$^+$	E3	0.20 *8*	α(K)exp=0.11 *5* I_γ: deduced from Adopted decay branch ratios with Iε=0.1% (1981Li30). α,α(K)exp: from Adopted Gammas.
642.23 *7*	0.08	687.55	1$^-$	45.243	2$^+$	E1(+M2+E3)	0.15 *2*	α(K)exp=0.111 *10*; α(L)exp=0.031 *9* I_γ: deduced from Adopted decay branch ratios and I(γ+ce) balance with Iε=0.1% (1981Li30). α,α(K)exp,α(L)exp: from Adopted Gammas.
687.59 *6*	0.02	687.55	1$^-$	0	0$^+$	E1	0.31 *2*	α(K)exp=0.219 *14*; α(L)exp=0.069 *9* α,α(K)exp,α(L)exp: from the Adopted Gammas. I_γ: deduced from Adopted branching ratios with Iε=0.1% (1981Li30).

† From 1983Ah02, unless otherwise noted.
‡ From Adopted Gammas, unless otherwise noted.
# For absolute intensity per 100 decays, multiply by 0.316 *10*.

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Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays