^{24}Al ε decay (130.7 ms) 1979Ho08,1971To12

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia, Anagha Chakraborty	NDS 186, 2 (2022)	31-Mar-2022

Parent: ^{24}Al: E=425.81 *10*; $J^\pi=1^+$; $T_{1/2}$=130.7 ms *13*; Q(ε)=13884.77 *23*; %ε+%$β^+$ decay=30.4 *7*

^{24}Al-E,J^π,$T_{1/2}$: From ^{24}Al Adopted Levels.

^{24}Al-Q(ε): From 2021Wa16.

Other references: 1966Ar02, 1979Sh11, 1982Ra05, 2011Ni18, 2011Ma88.

1979Ho08: ^{24}Al produced from ^{24}Mg(p,n). Ge(Li), Si(Au) detectors. Measured Eγ, Iγ, Iβ, Iα. A total %εα branching of 0.028 *6* has been reported.

1971To12: ^{24}Al produced from ^{24}Mg(p,n). Si(Au) detector. Measured β-delayed Eα, Iα, half-life.

1966Ar02: Measured Eγ and Iγ of isomeric transition, relative Iβ. Deduced IT branching. Ge(Li) and a wedge-gap magnetic spectrometer.

1979Sh11: Measured Eγ, Iγ, γ branching, β branching. Ge(Li), a counter telescope of two plastic scintillators.

1982Ra05: Measured Eγ, Iγ. Ge(Li) detector.

2011Ni18,2011Ma88: measured β decay time spectra, Eγ, γβ-coin; deduced β decay branching ratios. HPGe and scintillator detectors.

^{24}Mg Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0	0^+	stable	
1368.667 *5*	2^+		
4238.06 *24*	2^+		
9828.1 *20*	1^+		
9965.3 *11*	1^+		
10059 *3*	$(1,2)^+$		
10679.7‡ *3*	0^+		E(level): Other: 10683 *10* (1979Ho08).
10917.2‡ *3*	2^+		E(level): Other: 10922 *10* (1979Ho08).
11018‡ *3*	2^+		E(level): Others: 11017 *5* (1979Ho08), 11000 *20* (1971To12).
11457 *3*	(0^+)		E(level): Others: 11457 *10* (1979Ho08), 11440 *20* (1971To12).
11522‡ *2*	2^+		E(level): Others: 11520 *10* (1979Ho08), 11510 *30* (1971To12 in parentheses).
12404.9‡ *5*	2^+		E(level): Other: 12401 *10* (1979Ho08).
12467 *3*	2^+		E(level): Other: 12459 *10* (1979Ho08).

† From a least-squares fit to γ-ray energies, except where otherwise noted.

‡ From Adopted Levels.

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ #	Iε#	Log *ft*	I(ε+$β^+$)†#	Comments
(1844 *3*)	12467	$4.\times10^{-5}$ *2*	$2.\times10^{-6}$ *1*	5.68 *22*	4×10^{-5}‡ *2*	av Eβ=334.4 *13*; εK=0.0467 *6*; εL=0.00407 *5*; εM+=0.000262 *3*
(1905.7 *6*)	12404.9	$8.\times10^{-5}$ *3*	$3.\times10^{-6}$ *1*	5.50 *17*	8×10^{-5}‡ *3*	av Eβ=360.75 *25*; εK=0.03744 *8*; εL=0.003259 *7*; εM+=0.0002100 *4*
(2788.6 *20*)	11522	0.0017 *6*	$8.\times10^{-6}$ *3*	5.43 *16*	0.0017‡ *6*	av Eβ=757.03 *98*; εK=0.004521 *16*; εL=0.0003935 *1*; εM+=2.535×10^{-5} *9*
(2854 *3*)	11457	0.009 *3*	$4.\times10^{-5}$ *1*	4.77 *15*	0.009‡ *3*	av Eβ=787.1 *14*; εK=0.004053 *21*; εL=0.0003527 *1*; εM+=2.272×10^{-5} *12*
(3293 *3*)	11018	0.016 *5*	3.7×10^{-5} *12*	4.92 *14*	0.016‡ *5*	av Eβ=992.0 *15*; εK=0.002123 *9*; εL=0.0001847 *8*; εM+=1.190×10^{-5} *5*

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ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ #	Iε#	Log ft	I(ε+β+)†#	Comments
(3393.4 *4*)	10917.2	9.×10^{-5} *4*	2.×10^{-7} *1*	7.26 *20*	9×10^{-5}‡ *4*	av Eβ=1039.48 *19*; εK=0.001863 *1*; εL=0.000162; εM+=1.0445×10^{-5} *6*
(3630.9 *4*)	10679.7	0.0009 *3*	1.×10^{-6}	6.44 *15*	9×10^{-4}‡ *3*	av Eβ=1151.91 *19*; εK=0.0014004 *7*; εL=0.000122; εM+=7.849×10^{-6} *4*
(4252 *3*)	10059	0.17 *9*		4.58 *23*	0.17 *9*	av Eβ=1448.6 *15*
(4345.3 *11*)	9965.3	1.83 *19*	0.00136 *14*	3.60 *5*	1.83 *19*	av Eβ=1493.70 *55*; εK=0.0006805 *7*; εL=5.920×10^{-5} *6*; εM+=3.814×10^{-6} *4*
(4482.5 *20*)	9828.1	0.17 *9*		4.71 *23*	0.17 *9*	av Eβ=1559.83 *98*
(10072.5 *4*)	4238.06	0.33 *12*		6.37 *16*	0.33 *12*	av Eβ=4308.81
(12941.9 *3*)	1368.667	3.7 *9*		5.89 *11*	3.7 *9*	av Eβ=5735.17 I(ε+β+): Other: 3.6 *5* in 2011Ni18.
(14310.6 *3*)	0	24.3 *11*		5.30 *2*	24.3 *11*	av Eβ=6416.56 I(ε+β+): Other: 24.3 *9* in 2011Ni18.

† From γ-ray intensity balance for levels up to 10058.54, except where otherwise noted.
‡ From %α branching in 1979Ho08.
# Absolute intensity per 100 decays.

γ(^{24}Mg)

Iγ normalization: From %Iγ(1368.6)=4.4 *10*, deduced in 2011Ni18 from β-γ coincidence measurements and the Iγ(1368.6) component for this isomeric decay with respect to the ^{24}Al ε decay (2.053 s).

Eγ†	Iγ#a	Ei(level)	J_i^π	Ef	J_f^π	Mult.@	δ@	α&	Comments
1368.625‡ *5*	5.3 *10*	1368.667	2+	0	0+	E2		5.62×10^{-5} *8*	%Iγ=4.4 *10* α=5.62×10^{-5} *8*; α(K)=9.29×10^{-6} *13*; α(L)=5.97×10^{-7} *9*; α(M)=2.21×10^{-8} *3* α(IPF)=4.63×10^{-5} *7* Eγ: Other: 1368.6 *1* (1979Ho08).
2869.3 *4*	0.1 *1*	4238.06	2+	1368.667	2+	M1+E2	−23 *9*	7.29×10^{-4}	α(K)=2.38×10^{-6} *4*; α(L)=1.529×10^{-7} *22*; α(M)=5.67×10^{-9} *8* α(IPF)=0.000727 *11*
4237.6 *3*	0.3 *1*	4238.06	2+	0	0+	[E2]		1.25×10^{-3}	α(K)=1.330×10^{-6} *19*; α(L)=8.54×10^{-8} *12*; α(M)=3.16×10^{-9} *5* α(IPF)=0.001253 *18*
8595.1 *15*	0.6 *1*	9965.3	1+	1368.667	2+				
8688.6 *25*	0.2 *1*	10059	(1,2)+	1368.667	2+				
9825.9 *20*	0.2 *1*	9828.1	1+	0	0+				
9963.0 *15*	1.6 *2*	9965.3	1+	0	0+				

† From 1979Ho08, except otherwise noted.
‡ From Adopted Gammas.
# From 1979Ho08, except where otherwise noted.

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^{24}Al ε decay (130.7 ms) 1979Ho08,1971To12 (continued)

γ(^{24}Mg) (continued)

@ From Adopted Gammas.
& Additional information 1.
a For absolute intensity per 100 decays, multiply by 0.830 *19*.

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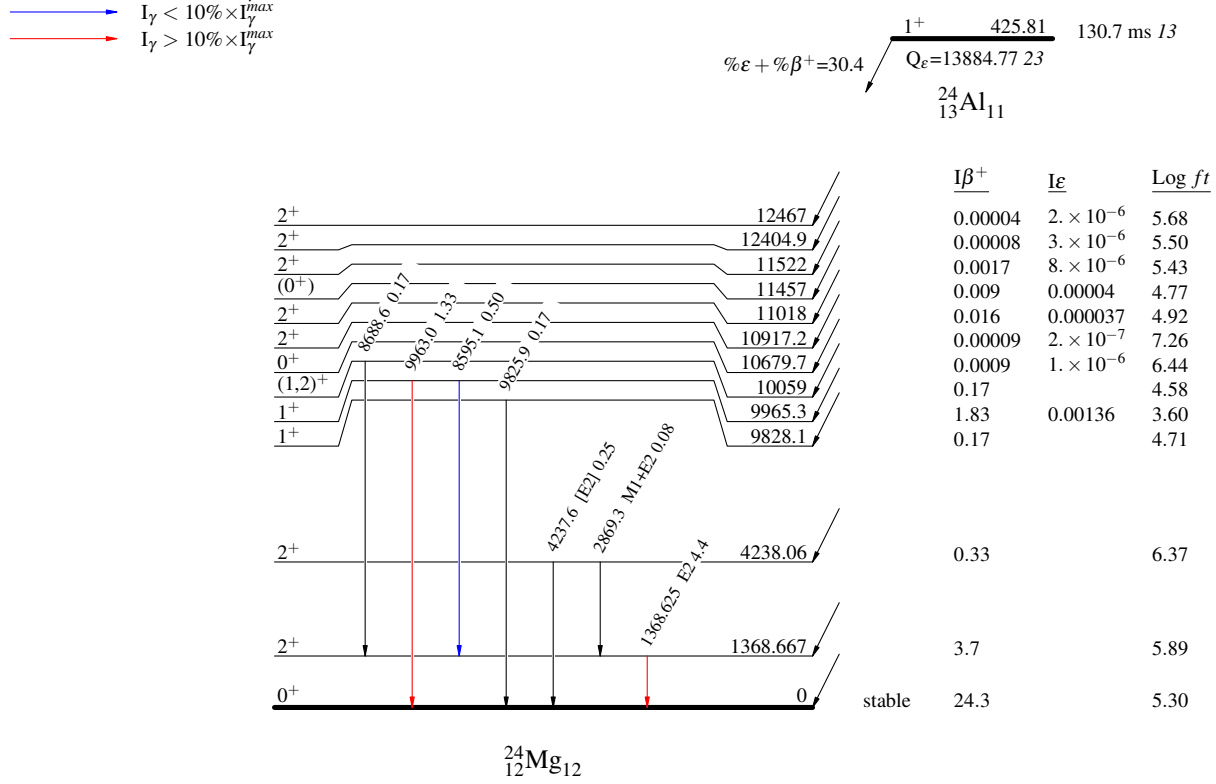
Decay Scheme

Intensities: I_γ per 100 parent decays

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



	Iβ+	Iε	Log *ft*
	0.00004	$2. \times 10^{-6}$	5.68
	0.00008	$3. \times 10^{-6}$	5.50
	0.0017	$8. \times 10^{-6}$	5.43
	0.009	0.00004	4.77
	0.016	0.000037	4.92
	0.00009	$2. \times 10^{-7}$	7.26
	0.0009	$1. \times 10^{-6}$	6.44
	0.17		4.58
	1.83	0.00136	3.60
	0.17		4.71
	0.33		6.37
	3.7		5.89
stable	24.3		5.30

$^{24}_{12}Mg_{12}$