

^{24}Na β^- decay (14.956 h)

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

Parent: ^{24}Na : $E=0$; $J^\pi=4^+$; $T_{1/2}=14.956$ h 3; $Q(\beta^-)=5515.677$ 21; $\% \beta^-$ decay=100.0

^{24}Na - $J^\pi, T_{1/2}$: From ^{24}Na Adopted Levels.

^{24}Na - $Q(\beta^-)$: From [2021Wa16](#).

Source production by $^{23}\text{Na}(n,\gamma)$.

[1951Tu12](#): Organic crystal scintillator. Measured secondary electron spectrum from ^{24}Na .

[1952Bl53](#): β -ray spectrometer (Agnew and Anderson). Measured the positron spectra from the internal pair conversion of γ .

[1960Ar10](#): Measured γ -spectrum in the 2500-5500 keV energy range.

[1961Gl17](#): NaI(Tl). Measured 2754γ - 1368γ (θ).

[1962Mo09](#): NaI(Tl). Measured $E\gamma$, $I\gamma$.

[1963Ha22](#): γ -ray polarimeter, integral β spectrometer, measured circular polarization.

[1968Va06](#): NaI(Tl). Measured $E\gamma$, $I\gamma$.

[1970Le12](#): NaI(Tl). Measured $E\gamma$, $I\gamma$.

[1972Ra21](#): Ge(Li) detector, measured $E\gamma$, $I\gamma$, deduced $\log ft$.

[1985LoZT](#): Compilation and recommendation $E\gamma$, $I\gamma$.

[1995HeZZ](#): Compilation and recommendation $E\gamma$, $I\gamma$.

[2003Ep02](#): HPGe. Measured $E\gamma$, $I\gamma$.

 ^{24}Mg Levels

E(level) [†]	J^π [‡]	$T_{1/2}$	Comments
0	0^+	stable	
1368.667 5	2^+		$I\beta=0.003$ (1951Tu12) yields a $\log ft$ value of 12.7.
4122.844 12	4^+		
4238.38 13	2^+		
5235.21 8	3^+		

[†] From $E\gamma$.

[‡] From Adopted Levels.

 β^- radiations

E(decay)	E(level)	$I\beta$ ^{†‡}	Log ft	Comments
(280.47 8)	5235.21	≈ 0.070	≈ 6.66	av $E\beta=89.985$ 30 $I\beta^-$: Approximate value by the evaluators. Others: 0.070 6 from $I\gamma$ intensity balance, yields total $I\beta$ slightly lower compared to $\Sigma I\beta=100$; 0.070 3 (1972Ra21).
(1392.833 24)	4122.844	99.867 10	6.12 1	av $E\beta=555.10$

[†] From γ -ray intensity balance at each levels.

[‡] Absolute intensity per 100 decays.

²⁴Na β⁻ decay (14.956 h) (continued)

<u>γ(²⁴Mg)</u>										
<u>E_γ</u>	<u>I_γ[#]</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.</u>	<u>δ</u>	<u>α[@]</u>	<u>I_(γ+ce)[#]</u>	<u>Comments</u>
996.83 10	0.0021 2	5235.21	3 ⁺	4238.38	2 ⁺					E _γ : From Adopted Gammas. I _γ : From adopted branching ratios.
1368.625 5	99.994 2	1368.667	2 ⁺	0	0 ⁺	E2		1.3×10 ⁻⁵	3	E _γ : From 1995HeZZ. I _γ : From 1985LoZT, in their Ref. [4], p. 404. Mult.: From γγ(θ), internal pair conversion coefficient 6×10 ⁻⁵ 1 (1952B153).
2754.008 11	99.867 10	4122.844	4 ⁺	1368.667	2 ⁺	E2				E _γ : From 1995HeZZ. I _γ : unweighted average of Pγ(2754.0)=0.99876 8 [from 1985LoZT, in their Ref. [4], p. 404] and 0.99857 5 [using the data in Ref. [3], p. 105 of 1985LoZT: Pγ(1368.7): Pγ(2754.0)=1: 0.998635 5 and adopted Pγ(1368.7)=0.99994 2). Mult.: From γγ(θ), internal pair conversion coefficient 7.1×10 ⁻⁴ 2 (1952B153).
2871.0 [†] 10	0.00025 [†] 4	4238.38	2 ⁺	1368.667	2 ⁺	M1+E2 [‡]	-23 [‡] 9			
3866.15 10	0.068 6	5235.21	3 ⁺	1368.667	2 ⁺	E2(+M1) [‡]	-17 [‡] 4			E _γ : From Adopted Gammas. I _γ : unweighted average of 0.061 5 (1972Ra21), 0.0489 25 (1970Le12) 0.075 20 (1962Mo09), 0.063 6 (1968Va06), 0.067 2 (2003Ep02), and 0.09 2 (1960Ar10).
4238.9 [†] 10	0.00084 [†] 10	4238.38	2 ⁺	0	0 ⁺	[E2]				I _γ : Other values: <0.0033 (1970Le12), 0.008 3 (1962Mo09), 0.00085 39 (2003Ep02) and 0.0015 5 (1960Ar10).

[†] From 1972Ra21.

[‡] From Adopted Gammas.

[#] Absolute intensity per 100 decays.

[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

${}^{24}\text{Na} \beta^-$ decay (14.956 h)

Decay Scheme

Intensities: I_γ per 100 parent decays

Legend

