22 Na ε decay

History

Type Author Citation Literature Cutoff Date
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Parent: 22 Na: E=0.0; J $^{\pi}$ =3 $^{+}$; T $_{1/2}$ =2.6018 y 22; Q(ε)=2843.20 17; % ε +% β $^{+}$ decay=100.0

Decay scheme from the Table de Radionuclides – CEA ISBN 2 7272 0200 8, except as noted. Produced by $^{19}F(\alpha,n)$, $^{24}Mg(d,\alpha)$.

Others: 2009Si18,2008Li02,2008Ru01,2006Li34,1983Ba41,1976Ma38, 1968Le03.

²²Ne Levels

KLL Auger electron data from 2007In06

The absolute energy of the $KL_2L_3(^1D)$ Auger transition is 824.5 eV 19 relative to Fermi level. This energy is higher by about 20 eV compared to that obtained in experiments with free Ne atoms.

Transitions	Relative energies (in eV)	Relative intensities $(\mathrm{KL_iL_j}/\Sigma\mathrm{KLL},\%)$
KL ₁ L ₁ (¹ S)	-56.0 2	6.2 4
KL ₁ L ₂ (¹ P)	-32.7 1	16.8 7
KL ₁ L ₃ (³ P)	-21.9 2	6.8 5
KL ₂ L ₂ (¹ S)	-4.3 5	8.5 10
KL ₂ L ₃ (¹ D)	0	61.7 17
Unknown	+18.5 5	2.8 5

 $\begin{array}{c|cc} E(level) & J^{\pi} & T_{1/2} \\ \hline 0 & 0^{+} & stable \\ 1274.53 \ 7 & 2^{+} \end{array}$

ε, β^+ radiations

E(decay)	E(level)	Ιβ ⁺ †	$\underline{\hspace{1cm}}^{\dagger}$	Log ft	$I(\varepsilon + \beta^+)^{\dagger}$	Comments
(1568.67 18)	1274.53	89.90 9	10.04 9	7.41	99.944 <i>14</i>	av Eβ=216.012 76; εK=0.0927 1; εL=0.007674 8; εM+=0.0001076 1
						ε/β +=0.1071 5, weighted average of measured values: 0.1084 27 (2009Na08), 0.1050 29
						(1990Ku11), 0.1075 25 (1986Sy01), 0.1079 3 (1983Ba41), 0.1128 57 (1977Bo10); 0.1077 6
						(1976Ma38), 0.1042 <i>10</i> (1968We02), 0.1048 7
						(1967Le07), 0.1041 <i>10</i> (1964Wi04), 0.112 <i>4</i> (1959Ra09), and 0.110 <i>6</i> (1954Sh31). Theoretical
						value $\varepsilon/\beta += 0.1152 \ 3 \ (1978Fi11)$. Note
						$I\varepsilon/I\beta$ +=0.1064 2, $I\varepsilon$ and $I\beta$ + obtainted using the
(2843.20 17)	0	0.055 14	0.00098 25	14.92 ^{2u} 11	0.056 14	Log ft code available at NNDC, BNL website. av E β =835.46; ε K=0.016146 6; ε L=0.0013378 5; ε M+=1.8761×10 ⁻⁵ 7
						$\varepsilon_{\text{M}} + = 1.8761 \times 10^{-5} / 1996 \text{Sa}_{0} = 1.8761 \times 10^{-5} / 1996 \times$

[†] Absolute intensity per 100 decays.

22 Na ε decay (continued)

$$\gamma$$
(²²Ne)

Iy normalization: From Σ I(γ +ce) to (g.s.)=100.

$$\frac{E_{\gamma}}{1274.537\ 7} \quad \frac{I_{\gamma}^{\dagger}}{99.940\ 14} \quad \frac{E_{i}(level)}{1274.53} \quad \frac{J_{i}^{\pi}}{2^{+}} \quad \frac{E_{f}}{0} \quad \frac{J_{f}^{\pi}}{0^{+}} \quad \frac{Mult.}{E2} \quad \frac{\alpha^{\ddagger}}{2.8 \times 10^{-05}\ 3}$$

Comments

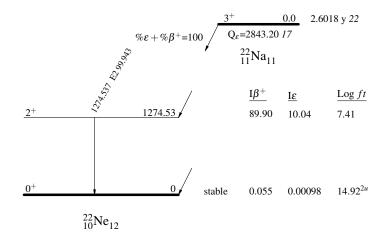
 E_{γ} : From 2000He14.

 α : $\alpha(\text{tot})=6.8\times10^{-4}$, from experimental value of 1985HaZA. Interpolated value is 6.8×10^{-6} from tables of 1976Ba63. Internal pair formation coefficient $\alpha_{\pi}=2.1\times10^{-5}$ 3 (1979Sc31). $\alpha=\alpha(\text{tot})+\alpha_{\pi}$.

22 Na arepsilon decay

Decay Scheme

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



[†] 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 multipolarities, and mixing ratios, unless otherwise specified.