^{22}Al ε decay 2006Ac04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 127, 69(2015)	1-Apr-2015

Parent: ^{22}Al: E=0; $J^\pi=(4)^+$; $T_{1/2}$=91.1 ms *5*; Q(ε)=18601 *SY*; %ε+%β^+ decay=100.0

Other references: 1997Cz02, 1997Bl03, 1982Ca16. β-delayed two-proton emission measurements: 1984Ca29, 1985Ja07, 1988Zh15, 1989Re02.

2006Ac04: ^{22}Al isotope produced by fragmentation of 95 MeV/nucleon ^{36}Ar beam on a carbon target. Reaction products separated by LISE3 zero-degree achromatic recoil spectrometer at GANIL. Measured Eγ, Iγ, $\gamma\gamma$, β, $\beta\gamma$ coin, (delayed particles)γ coin, isotopic half-life. Detection system: two Si detectors, a Si(Li) detector and an EXOGAM Ge clover detector. Comparisons with shell-model calculations.

1997Bl03, 1997Cz02: ^{22}Al produced by ^{58}Ni(^{36}Ar,x), E(^{36}Ar)=95 Mev/A. Reaction products separated by LISE3 zero-degree achromatic recoil spectrometer at GANIL. Measured $T_{1/2}$, β-delayed proton emission, 2-proton emission from IAS branch and $\beta\alpha$ emission branch.

1982Ca16: ^{22}Al isotope produced from the ^{24}Mg(^{3}He,p4n) reaction, E=110 MeV; measured β-delayed protons.

The experimental work of 2006Ac04, 1997Bl03, and 1997Cz02 were carried out at GANIL. Some coauthors are common. Listed data are from 2006Ac04.

^{22}Mg Levels

E(level)†	J^π#	$T_{1/2}$	Comments
0.0	0^+	3.8755 s *12*	
1247.02 *3*	2^+		
3308.21 *6*	4^+		
5293.11 *16*	(4^+)		
5451.8 *6*	(3^+)		
6221‡ *8*	(4^+)		
6307 *8*	4^+		
6476 *8*			
6724 *8*			
6865 *8*	(3^+)		
7052 *8*			
7132 *8*	(5^+)		
7254 *8*			
7573 *8*			
8004 *9*			
8339‡ *9*			
8416 *8*			
8589‡ *8*			
8985‡ *8*			
9518‡ *8*			
9725 *10*			
9965‡ *8*			
10413 *10*			
10678 *12*			
11309 *49*			
11410 *8*			
13018 *56*			
14012 *3*			E(level): IAS of ^{22}Al g.s.,4^+. Other value: 14044 keV *15* (1982Ca16).

† Level energies up to 5451.8 keV deduced by evaluator from γ-ray energies. Above energies are from 2006Ac04, except otherwise

Continued on next page (footnotes at end of table)

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^{22}Mg Levels (continued)

noted. These excitation energies were determined from the delayed charged particles and γ rays in coincidence when observed.
‡ Level supposed to emit protons to the ^{21}Na g.s.
# From Adopted Levels.

ε,β$^+$ radiations

E(decay)	E(level)	Iβ$^+$ #	Iε#	Log *ft*	I(ε+β$^+$)†#	Comments
(4589 *SY*)	14012	1.90 *20*	0.00116 *15*	3.56 *7*	1.90 *20*	av Eβ=1601 *44*; εK=0.00056 *5*; εL=4.9×10^{-5} *4*; εM+=3.14×10^{-6} *25*
(5583 *SY*)	13018	0.33 *7*		4.81 *11*	0.33 *7*	av Eβ=2084 *52*
(7191 *SY*)	11410	0.2 *6*		>5.0	0.2 *6*	av Eβ=2873 *46*
(7292 *SY*)	11309	0.2 *6*		>5.1	0.2 *6*	av Eβ=2923 *52*
(7923 *SY*)	10678	0.29 *11*		5.70 *17*	0.29 *11*	av Eβ=3235 *45*
(8188 *SY*)	10413	0.3 *3*		>5.5	0.3 *3*	av Eβ=3365 *45*
(8636 *SY*)	9965	2.52 *14*		4.96 *4*	2.52 *14*	av Eβ=3586 *45*
(8876 *SY*)	9725	0.84 *11*		5.51 *7*	0.84 *11*	av Eβ=3705 *45*
(9083 *SY*)	9518	1.0 *3*		5.48 *14*	1.0 *3*	av Eβ=3808 *45*
(9616 *SY*)	8985	2.18 *15*		5.28 *4*	2.18 *15*	av Eβ=4072 *45*
(10012 *SY*)	8589	1.89 *7*		5.43 *3*	1.89 *7*	av Eβ=4268 *45*
(10185 *SY*)	8416	4.89 *24*		5.06 *3*	4.89 *24*	av Eβ=4354 *45*
(10262 *SY*)	8339	2.11 *9*		5.44 *3*	2.11 *9*	av Eβ=4392 *45*
(10597 *SY*)	8004	0.64 *13*		6.03 *9*	0.64 *13*	av Eβ=4559 *45*
(11028 *SY*)	7573	0.48 *7*		6.25 *7*	0.48 *7*	av Eβ=4773 *45*
(11347 *SY*)	7254	0.45 *8*		6.34 *8*	0.45 *8*	av Eβ=4931 *45*
(11469 *SY*)	7132	18.5 *17*		4.75 *5*	18.5 *17*	av Eβ=4992 *45*
(11549 *SY*)	7052	0.81 *16*		6.13 *9*	0.81 *16*	av Eβ=5032 *45*
(11736 *SY*)	6865	3.0 *3*		5.60 *5*	3.0 *3*	av Eβ=5125 *45*
(11877 *SY*)	6724	0.75 *10*		6.23 *6*	0.75 *10*	av Eβ=5195 *45*
(12125 *SY*)	6476	0.25 *5*		6.75 *9*	0.25 *5*	av Eβ=5318 *45*
(12294 *SY*)	6307	4.7 *6*		5.51 *6*	4.7 *6*	av Eβ=5402 *45*
(12380 *SY*)	6221	7.4 *10*		5.33 *7*	7.4 *10*	av Eβ=5445 *45*
(13149 *SY*)	5451.8	5.9 *24*		5.56 *18*	5.9‡ *24*	av Eβ=5826 *45*
(13307 *SY*)	5293.11	31 *5*		4.87 *8*	31‡ *5*	av Eβ=5905 *45*

† From 2006Ac04.
‡ Deduced value in 2006Ac04 using relative γ-ray intensities in the literature.
# Absolute intensity per 100 decays.

γ(^{22}Mg)

E$_\gamma$†	I$_\gamma$‡#	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Comments
1246.98 *3*	38 *7*	1247.02	2$^+$	0.0	0$^+$	E$_\gamma$: 1248.5 keV *20* in 2006Ac04.
1984.80 *14*	31 *5*	5293.11	(4$^+$)	3308.21	4$^+$	E$_\gamma$: 1985.6 keV *13* in 2006Ac04.
2061.09 *5*	34 *6*	3308.21	4$^+$	1247.02	2$^+$	E$_\gamma$: 2062.3 keV *15* in 2006Ac04.
2143.5 *6*	1.7 *7*	5451.8	(3$^+$)	3308.21	4$^+$	E$_\gamma$: 1245 keV *5* in 2006Ac04.

† From Adopted Gammas. γ ray energies of 2006Ac04 listed as comments.
‡ From 2006Ac04.
# Absolute intensity per 100 decays.

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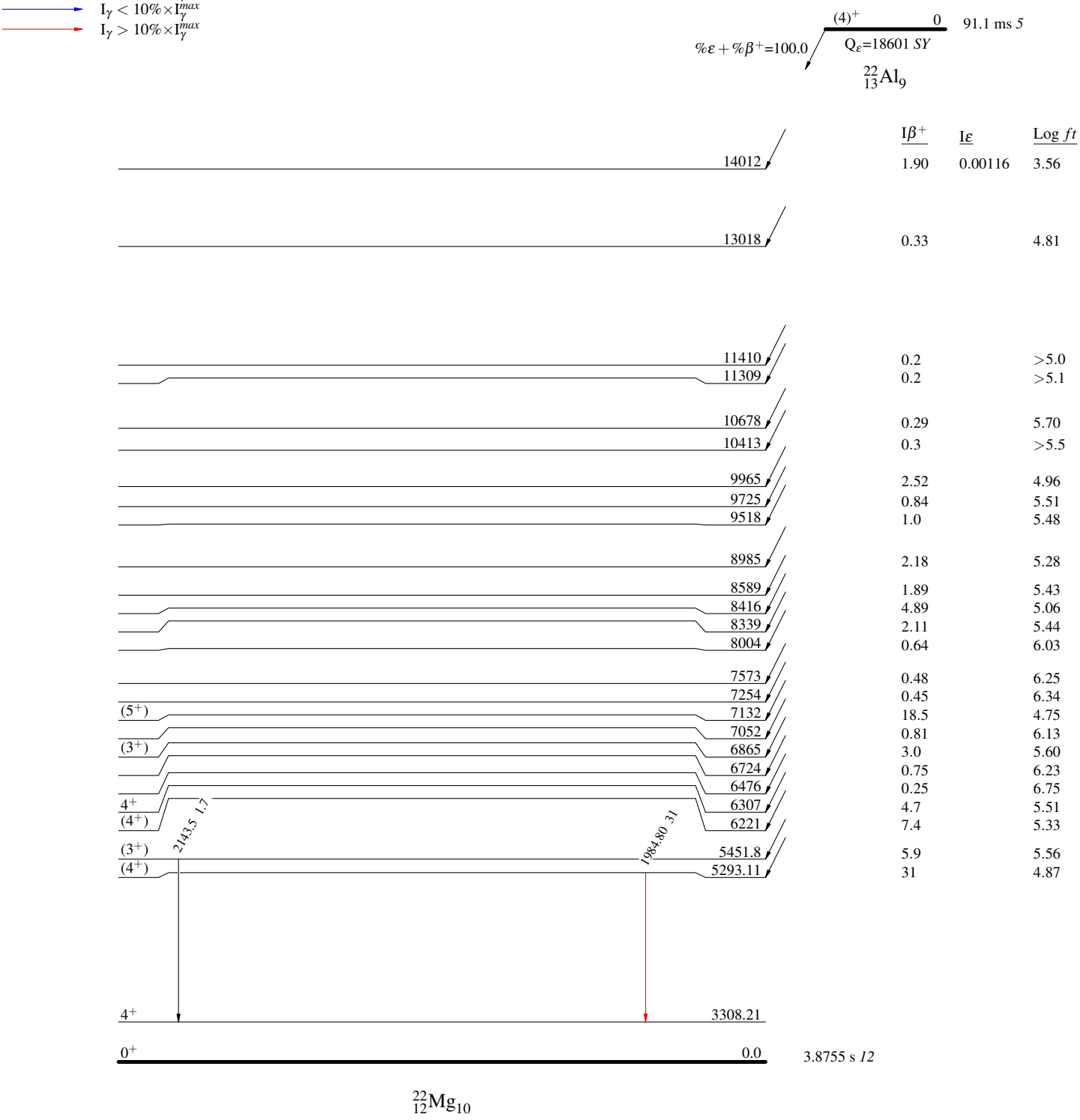
Decay Scheme

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

Legend

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



^{22}Al ε decay 2006Ac04

Decay Scheme (continued)

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