Adopted Levels, Gammas

Q(β^-)=14170 *40*; S(n)=5297 *8*; S(p)=15830.7 *89*; Q(α)=−14894.0 *78* 2021Wa16

S(p),Q(α): Deduced by the evaluator using mass excesses of 8318 *5* for ^{34}Mg: a weighted average of 8323 *7* (2019As04) and 8315 *5* (2025Ly01), and 12245.3 *26* for ^{31}Na measured by 2025Ly01; −224 *7* for ^{35}Al from 2021Wa16. Values from 2021Wa16: S(p)=15836 *10*, Q(α)=−14895 *16*.

S(2p)=38400.5 *85*, Q(ε)=−15753 *10*, from mass excesses of 23598.8 *43* for ^{33}Na and 15529.5 *71* for ^{35}Mg measured by 2025Ly01; −224 *7* for ^{35}Al from 2021Wa16. Values from 2021Wa16: S(2p)=38580 *450*, Q(ε)=−15860 *270*.

S(2n)=7869 *10*, Q(β^-n)=11697 *7* (2021Wa16).

Isotope discovery (2012Th10): C(^{40}Ar,X) projectile fragmentation at Berkeley (1979Sy01).

^{35}Al production:

2015Mo17: ^{9}Be(^{40}Ar,X) at E(^{40}Ar)=95 MeV/nucleon at RIKEN. Measured angular distributions and transverse momentum distributions of fragments. Deduced formulation for the width of transverse momentum distribution as a function of fragment velocity.

2012Kw02: ^{9}Be,^{nat}Ni,^{181}Ta(^{40}Ar,X) at E(^{40}Ar)=140 MeV/nucleon at NSCL. Measured fragmentation cross sections, parallel momentum transfers, and widths. Compared with empirical formula EPAX, and predictions from internuclear cascade and deep inelastic models using Monte Carlo ISABEL-GEMINI and DIT-GEMINI codes.

2012Zh06: ^{9}Be(^{40}Ar,X) at E(^{40}Ar)=57 MeV/nucleon at HIRFL. Measured momentum distributions and production cross sections of fragments. Observed competition between projectile fragmentation and other mechanisms. Compared with EPAX, abrasion-ablation, and HIPSE models. Studied target dependence of fragment cross sections.

2007No13: ^{9}Be(^{40}Ar,X) at E(^{40}Ar)=100 MeV/nucleon at RIKEN. Measured fragment momentum distributions and production cross sections.

^{35}Al decay measurements:

2017Ha23: ^{9}Be(^{40}Ar,X) at HIRFL. Measured $T_{1/2}$.

2005Ti11,2006AnZW: (^{36}S,X) at GANIL. Measured $T_{1/2}$, β^--delayed γ and neutron spectroscopy.

2001Nu01,2002Nu02: U(p,X) at CERN. Measured $T_{1/2}$, β^--delayed γ and neutron spectroscopy.

1999YoZW: ^{9}Be(^{48}Ca,X) and ^{181}Ta(^{48}Ca,X) at RIKEN. Measured $T_{1/2}$ and %β^-n.

1995ReZZ,2008ReZZ: ^{232}Th(p,X) at LAMPF. Measured $T_{1/2}$ and %β^-n, and average E_n.

1989Le16,1989MuZU: ^{181}Ta(^{48}Ca,X) at GANIL. Measured $T_{1/2}$ and %β^-n.

1988Mu08,1988MuZY,1988BaYZ: ^{181}Ta(^{86}Kr,X) at GANIL. $T_{1/2}$ and %β^-n.

^{35}Al radius measurement:

2006Kh08: ^{35}Al produced by ^{181}Ta(^{48}Ca,X) fragmentation at E(^{48}Ca)=60.3 MeV/nucleon at GANIL. Measured energy-integrated reaction cross sections at 30-65 MeV/nucleon using a silicon telescope as both active target and detector. Deduced reduced strong absorption radii, isospin dependence, and possible halo structure or large deformation.

^{35}Al knockout-reaction measurements:

2012No05: ^{33,34,35,36}Al produced by Be(^{48}Ca,X) fragmentation at E(^{48}Ca)=900 MeV/nucleon at GSI. Measured 1n removal cross sections and longitudinal momentum distributions of the residues. Deduced single-particle occupancies in the ground states of ^{33,34,35}Al. σ(^{35}Al->^{34}Al)=75 mb *4* and σ(^{36}Al->^{35}Al)=95 mb *5*.

2010Ro23: ^{35}Al produced by ^{9}Be(^{40}Ar,X) fragmentation at E(^{40}Ar)=700 MeV/nucleon at GSI. Measured 1n knockout cross sections and longitudinal momentum distributions of the residues. σ(^{35}Al->^{34}Al)=65 mb *18*.

^{35}Al in-beam γ spectroscopy:

2006FuZX: ^{35}Al produced by Be,C(^{40}Ar,X) at E(^{40}Ar)=63 MeV/nucleon at RIKEN. He(^{35}Al,X) at E(^{35}Al)=40 MeV/nucleon. Observed one γ ray at 760.1 keV *21* without placing it in the level scheme.

^{35}Al mass measurements: 2017Ga20, 2007Ju03, 1991Or01, 1991Zh24, 1987Gi05.

Theoretical calculations (binding energies, deformation, quadrupole moments, radii, levels, J, π, mass, $T_{1/2}$, etc): 2016Sa46, 2014Ca21, 2013Li39, 2013Sh05, 2011Ki12, 2009Yo05, 2004Kh16, 1994Po05.

^{35}Al Levels

Cross Reference (XREF) Flags

- A ^{36}Mg β^-n decay (6.9 ms)
- B ^{9}Be(^{36}Si,^{35}Alγ)
- C Pb(^{35}Al,^{34}Al$n\gamma$)
- D Coulomb excitation

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{35}Al Levels (continued)

E(level)†	J^π	$T_{1/2}$	XREF	Comments
0	$(5/2)^+$	38.1 ms *4*	ABCD	%β^-=100; %β^-n=36 *3*; %β^-2n=? %β^-n: Weighted average of 38 *2* (2005Ti11,2006AnZW) and 41 *13* (2001Nu01,2002Nu02), 26 *4* (1995ReZZ,2008ReZZ), and 40 *10* (1989Le16,1989MuZU). Other: 43 *9* (1999YoZW, preliminary), 87 *+37−25* (1988Mu08,1988BaYZ) with an unphysical upper bound. J^π: From shell-model calculations and L(^{36}Si,^{35}Al)=2 from 0^+. $T_{1/2}$: weighted average of 38.4 ms *3* (2017Ha23, implant-β correlation), 36.8 ms *5* (2005Ti11,2006AnZW, implant-β correlation), 38.6 ms *4* (2001Nu01,2002Nu02, three β-counting rates and one γ-counting rate), 30 ms *4* (1995ReZZ,2008ReZZ, implant-β/n correlation), 170 ms *+90−50* (1989Le16,1989MuZU, β-decay curve), 30 ms *10* (1988DuZT, beam pulsations), and 130 ms *+100−50* (1988Mu08,1988BaYZ, β counting rate). Reduced strong absorption radius r_0^2=1.188 fm^2 *14* from the energy-integrated σ of Si(^{35}Al,X) (2006Kh08). Major configurations for J^π=5/2$^+$ of ^{35}Al g.s. from Pb(^{35}Al,^{34}Al$n\gamma$): (g.s., 4^- in ^{34}Al)$\otimes\nu p_{3/2}$, S=0.36 *9* (2017Ch36); (46 keV, 1^+ in ^{34}Al)$\otimes\nu d_{3/2}$, S=1.47 *22* (2017Ch36); (1.4 MeV, 2^+ in ^{34}Al)$\otimes\nu s_{1/2}$, S=0.16 *1* (2021Bh12); (2.5 MeV, 3^- in ^{34}Al)$\otimes\nu p_{3/2}$, S=1.48 *18* (2021Bh12).
802 *3*			AB	
1007 *4*			B D	XREF: D(1020) B(E2)↑=0.0142 *52* (1999Ib01). B(E1)↑≤0.00020 *9*, B(E2)↑≤0.0125 *56*, B(M1)↑≤0.0024 *11*, and 5/2$^+$ -> 3/2$^{+/-}$ σ=30 mb *14* (2000PrZX). The multipolarities are assumed.
1866 *4*			B	
1975 *4*	$3/2^+,5/2^+$		B	
2734 *7*			B	
3245 *5*	$3/2^+,5/2^+$		B	
4275? *9*	$3/2^+,5/2^+$		B	XREF: B(4275?)

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

γ(^{35}Al)

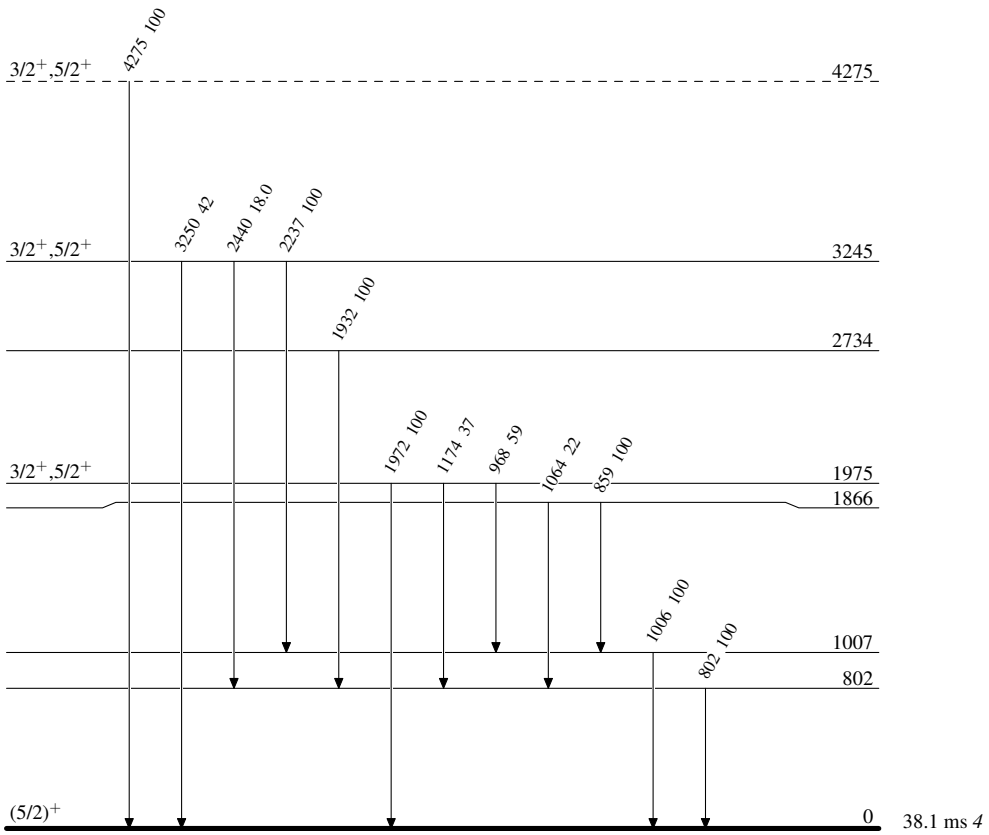
E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Comments
802		802 *4*	100	0	$(5/2)^+$	
1007		1006 *6*	100	0	$(5/2)^+$	E_γ: weighted average of 1003 *4* from (^{36}Si,^{35}Alγ) and 1020 *9* from Coulomb excitation.
1866		859 *4*	100 *8*	1007		
		1064 *4*	22 *6*	802		
1975	$3/2^+,5/2^+$	968 *4*	59 *4*	1007		
		1174 *5*	37 *4*	802		
		1972 *6*	100 *7*	0	$(5/2)^+$	
2734		1932 *6*	100	802		
3245	$3/2^+,5/2^+$	2237 *6*	100 *8*	1007		
		2440 *7*	18.0 *26*	802		
		3250 *8*	42 *5*	0	$(5/2)^+$	
4275?	$3/2^+,5/2^+$	4275 *9*	100	0	$(5/2)^+$	

† From ^{9}Be(^{36}Si,^{35}Alγ), unless otherwise noted.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



$^{35}_{13}Al_{22}$