Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	ENSDF	15-Dec-2017

Q(β^-)=14170 *40*; S(n)=5295 *8*; S(p)=15836 *30*; Q(α)=−14895 *16* 2017Wa10

Q(β^-n)=11662 *16*, S(2n)=7869 *10*, S(2p)=38580 *450* (2017Wa10). Evaluators deduce Q((β^-2n)=4150 *6* from mass values in 2017Wa10.

1979Sy01: ^{35}Al produced and identified in ^{12}C(^{40}Ar,X) reaction.

1988Mu08: fragmentation of ^{48}Ca at 45 MeV/nucleon by ^{181}Ta(^{86}Kr,X) reaction. Measured $T_{1/2}$.

Additional information 1.

1989Le16: fragmentation of ^{48}Ca at 45 and 55 MeV/nucleon by ^{181}Ta(^{48}Ca,X) reaction at the French National Facility GANIL. Measured $T_{1/2}$ and delayed neutron emission probabilities.

1995ReZZ: Nuclei of interest produced by ^{232}Th(p,X) at 800 MeV in the Time-of-flight spectrometer at the LAMPF accelerator. Measured half-life, delayed neutron-emission probability. See also 2008ReZZ communication.

1999YoZW: fragmentation of ^{48}Ca beam at 70 MeV/nucleon by ^{9}Be and ^{181}Ta targets at RIKEN. Measured half-life and delayed-neutron branches.

2001Nu01 (also 2002Nu02): ^{35}Al produced at the ISOLDE facility at CERN in fragmentation with 1.0 GeV proton beam on a uranium carbide target. Measured Eγ, Eγ, $\gamma\gamma$, $\beta\gamma$-coin, $T_{1/2}$ and delayed-neutron branches. Deduced levels, J^π, log *ft* for ^{35}Si.

2005Ti11: fragmentation of ^{36}S beam at 78 MeV/nucleon at GANIL. Measured β-delayed Eγ, $T_{1/2}$ and delayed neutron emission probability. Deduced levels, J^π, log *ft* for ^{35}Si. (conference paper).

2006Kh08: secondary beams produced by fragmentation of ^{48}Ca beam at 60.3 MeV/nucleon by ^{181}Ta targets at GANIL. Used a silicon telescope as both reaction target and detection system. Measured energy-integrated reaction cross-sections. Deduced radii, isospin dependence. (conference paper).

2006FuZX: He(^{35}Al,X), E=40 MeV/nucleon, measured Eγ, Iγ. One γ ray at 760.1 keV *21* reported in in-beam γ-ray spectrum, but no level scheme was proposed.

2012Kw02: ^{9}Be,Ni,^{181}Ta(^{40}Ar,X),E=140 MeV/nucleon, measured fission fragment spectra by energy loss from time-of-flight measurements, average isobaric velocities, parallel momentum transfers, and widths. Comparison with empirical formula EPAX, and predictions from internuclear cascade and deep inelastic models using Monte Carlo ISABEL-GEMINI and DIT-GEMINI computer codes.

2012Zh06: ^{9}Be(^{40}Ar,X),E=57 MeV/nucleon, measured particle spectra, energy loss, time of flight, fragment yields, momentum distributions, cross sections; deduced fragment excitation energies, mass yield ratios at RIBLL and HIRFL facilities.

2015Mo17: ^{9}Be(^{40}Ar,X),E=95 MeV/nucleon, measured time-of-flight, energy loss and angular distribution of fragments using RIKEN Projectile Fragment Separator; Analyzed transverse momentum distributions for fragments; deduced formulation for the width of transverse momentum distribution.

2017Ha23: E=69.2 MeV/nucleon ^{40}Ar beam was produced at the Heavy Ion Research Facility in Lanzhou (HIRFL). Target was 182.6 mg/cm^2 thick ^{9}Be. Fragments were identified based on energy loss, time-of-flight, and magnetic rigidity on an event-by-event basis, and implanted into a 1500−μm-thick double-sided Si strip detector (DSSD) between two plastic scintillators. Measured half-life of ^{35}Al decay from implant-β decay curve. Comparisons with previous measurements.

Mass measurements: 2017Ga20, 2007Ju03, 1991Or01, 1991Zh24, 1987Gi05.

Nuclear structure theory calculations for binding energies, deformation, quadrupole moments, radii, levels, J^π, mass, $T_{1/2}$, etc.: eight references extracted from the NSR database are listed as document records in the ENSDF dataset.

This nuclide is of possible relevance to “island of inversion” near N=20.

^{35}Al Levels

Cross Reference (XREF) Flags

- A Coulomb excitation
- B ^{9}Be(^{36}Si,^{35}Alγ)
- C Pb(^{35}Al,^{34}Al nγ)

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	$(5/2^+)$	38.3 ms *4*	ABC	%β^-=100; %β^-n=38 *2* (2015Bi01); %β^-2n=0 (2001Nu01) %β^-n: from 2015Bi01 evaluation, based on weighted average of 38 *2* (2005Ti11, 38 *3* in 2006AnZW); and 41 *13* (2001Nu01,2002Nu02). Others: 26 *4* (1995ReZZ,2008ReZZ); 40 *10* (1989Le16); 87 *+37−25* (1988Mu08). Theoretical $T_{1/2}$=70.7 ms, %β^-n=97.5, %β^-2n=0.3 (2016Ma12). Theoretical $T_{1/2}$=10.7 ms, %β^-n=8.3, %β^-2n=0.11 (2003Mo09). J^π: $(5/2^+)$ as proposed in 2001Nu01 from systematics in the Al isotopes and $5/2^+$ in calculations of 1994Po05. Also $5/2^+$ from syst in 2017Au03. Major configurations deduced by 2017Ch36 from Coulomb breakup of ^{35}Al on Pb target: for J^π(^{35}Al g.s.)=$5/2^+$, (g.s.,4^- in ^{34}Al)⊗$\nu p_{3/2}$ + (46 keV,1^+ in ^{34}Al)⊗$\nu d_{3/2}$. For $J^\pi=1/2^+$ or $3/2^+$ of ^{35}Al g.s.: (g.s.,4^- in ^{34}Al)⊗$\nu f_{7/2}$ + (46 keV,1^+ in ^{34}Al)⊗$\nu s_{1/2}$. Other configurations for $J^\pi=1/2^+,3/2^+$ of ^{35}Al g.s.: (46 keV,1^+ in ^{34}Al)⊗$\nu s_{1/2}$, (46 keV,1^+ in ^{34}Al)⊗$\nu s_{1/2}$ + (46 keV,1^+ in ^{34}Al)⊗$\nu d_{5/2}$. $T_{1/2}$: weighted average (normalized-residual method) of 38.4 ms *3* (2017Ha23, implant-β correlated decay curve); 36.8 ms *5* (2005Ti11, implant-β correlated decay curve, 36.4 ms *5* in 2006AnZW); 38.6 ms *4* (weighted average by 2001Nu01 from four independent measurements, three β-decays and one γ-decay). Others: 30 ms *4* (1995ReZZ,2008ReZZ, β-decay); 170 ms *+90−50* (1989Le16, β-decay); 30 ms *10* (1988DuZT,1987DuZU); 130 ms *+100−50* (1988Mu08, β-decay). Value is 37.6 ms *14* in 2015Bi01 evaluation, which did include the 2017Ha23 result. Mean square absorption radius=1.188 fm^2 *14* from 2006Kh08 in Si(^{35}Mg,X) reaction at E=33.79 and 38.79 MeV/nucleon, also measured energy-integrated cross sections, σ_R=2447 mb *46*.
802 *4*			B	
1003 *4*			AB	B(E2)=0.0142 *52* (1999Ib01). 2000PrZX give B(E2)≤0.0125 *56* or B(E1)≤0.00020 *9*, authors also deduce values for B(M1) and B(M2).
1864 *5*			B	
1972 *4*			B	
2734 *7*			B	
3243 *5*			B	
4275? *9*			B	

† From least-squares fit to Eγ data.

γ(^{35}Al)

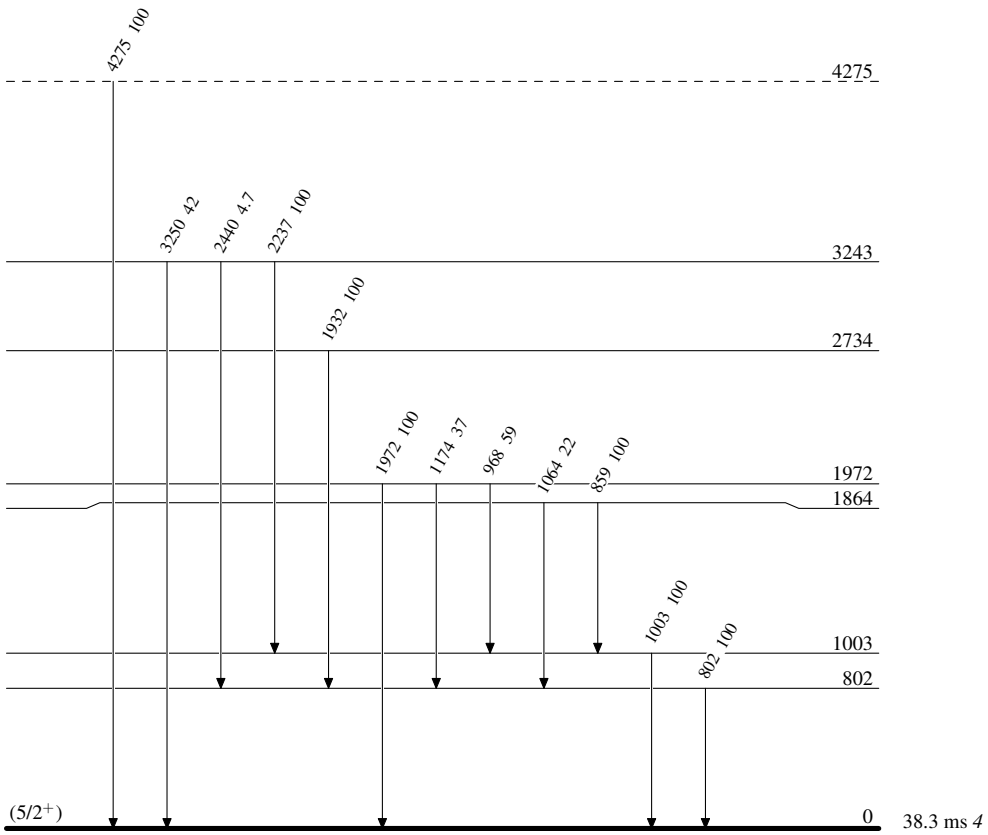
E_i(level)	E_γ†	I_γ†	E_f	J^π_f	Comments
802	802 *4*	100	0	$(5/2^+)$	
1003	1003 *4*	100	0	$(5/2^+)$	E_γ: from ^{9}Be(^{36}Si,^{35}Alγ). Other: 1020 *8* from Coul. ex.
1864	859 *4*	100 *8*	1003		
	1064 *4*	22 *6*	802		
1972	968 *4*	59 *4*	1003		
	1174 *5*	37 *4*	802		
	1972 *6*	100 *7*	0	$(5/2^+)$	
2734	1932 *6*	100	802		
3243	2237 *6*	100 *8*	1003		
	2440 *7*	4.7 *7*	802		
	3250 *8*	42 *5*	0	$(5/2^+)$	
4275?	4275 *9*	100	0	$(5/2^+)$	

† From ^{9}Be(^{36}Si,^{35}Alγ).

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



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