Adopted Levels, Gammas

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

Q(β^-)=22590 *syst*; S(n)=1520 *syst*; S(p)=21900 *syst*; Q(α)=−20340 *syst* 2017Wa10

Estimated uncertainties: ΔQ(β^-)=720, ΔS(n)=300, ΔS(p)=840, ΔQ(α)=870 (2017Wa10).

Q(β^-n)=21840 *670*, S(2n)=1690 *810* (syst,2017Wa10). S(2p)=50400 (theory, 1997Mo25). From mass values in 2017Wa10, evaluators deduce Q(β^-2n)=17120 *770*, Q(β^-3n)=14845 *770*, Q(β^-4n)=9070 *770*, Q(β^-5n)=6760 *770*.

1983La12 (also 1984La03): ^{35}Na produced and identified in Ir(p,X) reaction at 10 GeV in the CERN-ISOLDE facility. A 4πi-geometry liquid scintillator (4 l useful volume) associated with a thin plastic detector of the same geometry for detecting neutrons. Measured βn-coincidence and $T_{1/2}$. Deduced evidence for ^{35}Na.

2002LuZT: measured yield of ^{35}Na in Ta(^{48}Ca,X) E=59.8 MeV/nucleon fragmentation reaction.

2013StZY: ^{35}Na activity was produced in ^{9}Be(^{48}Ca,X) at E(^{48}Ca)=345 MeV/nucleon from the RIBF-RIKEN facility. Fragments were separated using BigRIPS and ZeroDegree spectrometers on the basis of Bρ-ΔE-Bρ and TOF measurements with position-sensitive detectors. Separated ions of ^{35}Na were implanted into CAITEN segmented detector for recoils and β detection. The γ radiation was measured by DALI2 array of NaI(Tl) detectors and three Ge clover detectors. Measured half-life of the decay of ^{35}Na.

Nuclear structure theory calculations for binding energies, deformation, quadrupole moments, radii, levels, J^π, mass, $T_{1/2}$, etc.: 13 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.

Additional information 1.

β^- or delayed-neutron decaying precursor nuclides ^{35}Ne, ^{36}Ne or ^{37}Ne have not been experimentally identified.

^{35}Na Levels

Cross Reference (XREF) Flags

A C(^{36}Mg,^{35}Naγ)

E(level)	J^π[†]	$T_{1/2}$	XREF	Comments
0[‡]	(3/2$^+$)	1.8 ms *5*	A	%β^-=100; %β^-n>0; %β^-2n=?; %β^-3n=?; %β^-4n=? %β^-5n=? The β^-n decay mode was observed by 1983La12, but %β^-n was not deduced. According to the theoretical calculations (2003Mo09 and 2016Ma12), almost 100% decay is through delayed-neutron branches. In β-delayed γ-ray spectrum, 2013StZY observed one γ ray at 661 keV from the decay of ^{35}Na, which was proposed either a transition from the first 2$^+$ in ^{34}Mg or from an excited state in ^{35}Mg. Based on theoretical predictions of strong delayed-neutron branches, this γ ray most likely is from the first 2$^+$ state in ^{34}Mg. Theoretical $T_{1/2}$=7.9 ms, %β^-n=16.9, %β^-2n=74.8, %β^-3n=3.9, %β^-4n=3.3, %β^-5n=0.5 (2016Ma12). Theoretical $T_{1/2}$=2.8 ms, %β^-n=56.9, %β^-2n=18.9, %β^-3n=24.2 (2003Mo09). J^π: 3/2$^+$ also from systematics of odd-A Na nuclides (2017Au03), and from theory (1997Mo25). $T_{1/2}$: from 2015Bi05 evaluation, where weighted average is taken of the two measured values: 2.4 ms *7* (2013StZY, (implant)β correlated curve by including in the analysis the β, β-n and β-2n daughter and grand-daughter activities, statistical and systematic uncertainties included); 1.5 ms *5* (1983La12,1984La03, decay curve for delayed neutrons).
373[‡] *5*	(5/2$^+$)		A	
1014[‡] *17*	(7/2$^+$)		A	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{35}Na Levels (continued)

† From Monte-Carlo shell-Model calculations using the SPDF-M effective interaction (2014Do05).
‡ Band(A): $K^{\pi}=(3/2^{+})$ band. Rotational band predicted by shell model calculations (2014Do05).

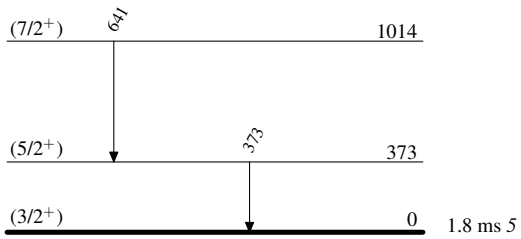
$\gamma(^{35}Na)$

E_i(level)	J_i^{π}	E_{γ} †	E_f	J_f^{π}
373	$(5/2^{+})$	373 *5*	0	$(3/2^{+})$
1014	$(7/2^{+})$	641 *16*	373	$(5/2^{+})$

† From C(^{36}Mg,^{35}Naγ).

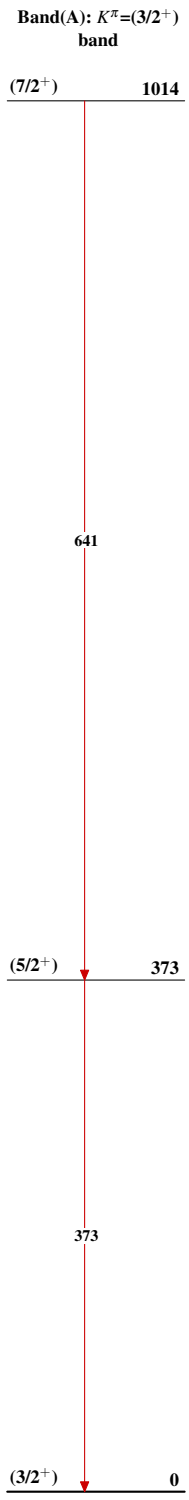
Adopted Levels, Gammas

Level Scheme



$^{35}_{11}Na_{24}$

Adopted Levels, Gammas



$^{35}_{11}Na_{24}$