

Adopted Levels, Gammas

Type	Author	History	Literature Cutoff Date
Full Evaluation	Balraj Singh	Citation ENSDF	21-May-2021

$Q(\beta^-)=1443\times 10^1$ 71; $S(n)=333\times 10^1$ 74; $S(p)=24740$ SY; $Q(\alpha)=-19040$ SY 2021Wa16

Estimated uncertainties (2021Wa16): $\Delta S(p)=960$, $\Delta Q(\alpha)=850$.

$Q(\beta^-n)=12530$ 690, $S(2n)=4090$ 690, $S(2p)=47040$ 860 (syst) (2021Wa16). $Q(\beta^-2n)=1237$ 690, deduced by the evaluator from mass values in 2021Wa16.

With the identification of g.s. and first 2^+ state as intruder levels (2007Ga34), this nuclide has been characterized as situated in the so called 'island of inversion'.

1989Gu03: $^{181}\text{Ta}(^{48}\text{Ca},X)$ E=55 MeV/nucleon, GANIL. Particle stability of ^{36}Mg first established.

1999YoZW: $^9\text{Be}, ^{181}\text{Ta}(^{48}\text{Ca},X)$ E=70 MeV/nucleon, RIKEN. Measured half-life, β^-n , very preliminary results.

Additional information 1.

2004Gr20, 2003Gr22: ^{36}Mg from fragmentation of 60 MeV/nucleon ^{48}Ca beam with ^9Be target, time-of-flight and energy loss methods to identify fragments, LISE-3 spectrometer at GANIL. Measured isotopic half-life.

2007Ta15: $^9\text{Be}, W(^{48}\text{Ca},X)$, measured production cross section.

2007Ga34: $^9\text{Be}(^{38}\text{Si},X\gamma)$, established intruder character of g.s. and first excited 2^+ state; NSCL.

Mass measurements: 2007Ju03, 2000Sa21 (also 2001Sa72).

Theory references: consult the NSR database (www.nndc.bnl.gov/nsr/) for 37 primary references for structure calculations.

^{36}Na is experimentally found (2002Lu09,2002No11) to be particle unstable, thus it does not decay by β^- to ^{36}Mg .

^{37}Na nuclide is known (2004Lu19,2003Lu11,2002Lu09,2002Lu19,2002No11) to be particle stable, but no experimental information is available for b^- delayed neutron decay to ^{36}Mg .

 ^{36}Mg LevelsCross Reference (XREF) Flags

A	$^1\text{H}(^{36}\text{Mg}, ^{36}\text{Mg}'\gamma)$	D	$\text{C}(^{40}\text{Al}, ^{36}\text{Mg}\gamma), ^1\text{H}(^{40}\text{Al}, ^{36}\text{Mg})$
B	$^9\text{Be}(^{38}\text{Si}, ^{36}\text{Mg}\gamma)$	E	$\text{Pb}(^{36}\text{Mg}, ^{36}\text{Mg}'\gamma)$
C	$\text{C}(^{37}\text{Al}, ^{36}\text{Mg})$	F	$\text{Pb}(^{37}\text{Mg}, ^{36}\text{Mg}\gamma)$

E(level) [†]	J ^π	T _{1/2}	XREF	Comments
0 [‡]	0 ⁺	7.6 ms +5-8	ABCDEF	$\beta^-n=100$; $\beta^-n=?$ $\beta^-n=48$ 12 (1999YoZW, preliminary value). Theoretical T _{1/2} =15.9 ms, $\beta^-n=53$, $\beta^-2n=1$ (2019Mo01). Theoretical T _{1/2} =15.1 ms, $\beta^-n=81.1$, $\beta^-2n=1.6$ (2016Ma12). T _{1/2} : from 2013StZY (β -fragment correlated decay curve, with statistical and systematic uncertainties combined). Others: 3.9 ms 13 (2004Gr20,2003Gr22, β -fragment correlated decay curve); ≈ 5 ms (1999YoZW, preliminary value).
662 [‡] 5	2 ⁺	41 ps +12-8	ABCDEF	B(E2) $\uparrow$ =0.053 12 (2016Do03) J ^π : level is populated in Coulomb excitation and inelastic nuclear scattering. T _{1/2} : deduced from B(E2) $\uparrow$ in $\text{Pb}(^{36}\text{Mg}, ^{36}\text{Mg}'\gamma)$ (2016Do03).
2008 26	(4 ⁺)		CD F	XREF: F(?). J ^π : systematics of even-even nuclei, and shell-model predictions.

[†] From E_γ values.

[‡] Partial cross sections in $^9\text{Be}(^{38}\text{Si},X\gamma)$ reaction (2007Ga34) and wave functions are found (by 2007Ga34) to be dominated by intruder configurations as suggested by large-scale Monte Carlo shell-model calculations in the island of inversion.

Adopted Levels, Gammas (continued)

$\gamma(^{36}\text{Mg})$							
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	Comments
662	2^+	662 5	100	0	0^+	[E2]	B(E2)(W.u.)=15.0 35 E _γ : weighted average of 659 6 (2019Cr02, (^{40}Al , $^{36}\text{Mg}\gamma$)); 666 5 (2016Do03, Pb(^{36}Mg , $^{36}\text{Mg}'\gamma$)); 656 13 (2014Mi09, ^1H (^{36}Mg , $^{36}\text{Mg}'\gamma$)); 662 6 (2013Do22, (^{37}Al , $^{36}\text{Mg}\gamma$)); and 660 6 (2007Ga34, (^{38}Si , $^{36}\text{Mg}\gamma$)).
2008	(4^+)	1346 25	100	662	2^+		E _γ : weighted average of 1319 21 (2019Cr02, (^{40}Al , $^{36}\text{Mg}\gamma$)); and 1370 20 (2013Do22, (^{37}Al , $^{36}\text{Mg}\gamma$)).

Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level

