Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	27-May-2014

Q(β^-)=9210 *SY*; S(n)=5320 *SY*; S(p)=17690 *SY*; Q(α)=−8760 *SY* 2012Wa38
Estimated uncertainties (2012Wa38): ΔQ(β^-)=420, ΔS(n)=470, ΔS(p)=ΔQ(α)=640.
S(2n)=8050 *420*, S(2p)=31790 *720*, Q(β^-n)=5050 *460* (2012Wa38,syst).
1992We04: ^{9}Be(^{86}Kr,X) E=500 MeV/nucleon. Mass separation using magnetic spectrometer. Isotope identification with zero-degree magnetic spectrometer, time-of-flight and energy loss measurements.
1999So20 (also 1999Le67): ^{58}Ti from ^{58}Ni(^{86}Kr,X) reaction at 60.4 MeV/nucleon. Measured Eβ, Iβ(t), isotopic half-life.
2002MaZN: Fragmentation of ^{86}Kr beam, LISE spectrometer, measured isotopic half-life.
2005Ga01 (also 2003So21): ^{58}Ti produced in fragmentation of ^{76}Ge^{30+} beam on a ^{58}Ni target at 61.8 MeV/nucleon. LISE3 achromatic spectrometer used to separate fragments; magnetic rigidity was tuned to optimize transmission of ^{62}V and ^{64}Cr fragments. Transmitted nuclei were identified by three consecutive Si detectors where two were used for energy loss and time-of-flight measurements while the third was used to determine their residual energies. Measured Eγ, Iγ, Iβ, $\gamma\gamma$, $\beta\gamma$ coin, γ(t), lifetimes with four Ge detectors placed around a thick Si telescope. Half-lives determined by fitting procedure involving five parameters: half-lives of mother, daughter and grand-daughter nuclei, the β-efficiency and the background rate over the 1 s collecting time.
2011Da08 (also 2002MaZN thesis): ^{58}Ti produced in fragmentation of 57.8 MeV/nucleon ^{86}Kr beam impinged on 50 mg/cm^2 thick tantalum target using LISE-2000 spectrometer at GANIL facility. Detector system included a three-element Si-detector telescope containing a double-sided silicon-strip detector (DSSSD) backed by a Si(Li) detector and surrounded by four clover type EXOGAM Ge detectors. Product identified by mass, atomic number, charge, energy loss and time of flight. Measured half-life.
Additional information 1.
Theoretical nuclear structure calculations:
2014Ka03: calculated energy and B(E2) of first 2$^+$ level.
2012Ca30: calculated energy levels, J, p, electric quadrupole and dipole magnetic moments; shell model calculations.
2006Ma23: calculated levels, spins and parities. Shell-model.
2008Gu03: calculated potential energy surfaces and g.s. deformation.

^{58}Ti Levels

Cross Reference (XREF) Flags

A ^{58}Sc β^- decay (12 ms)
B ^{1}H(^{58}Ti,^{58}Ti′γ)
C ^{9}Be(^{61}V,^{58}Tiγ)

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0	0$^+$	58 ms *9*	ABC	%β^-=100; %β^-n=? T$_{1/2}$: weighted average of 57 ms *10* (2011Da08,2002MaZN, from time correlation between implantation and β-ray events with the inclusion of parameters for β-detection efficiency, background rate, mother, daughter and grand-daughter half-lives); 59 ms *9* (2005Ga01,2003So21, from β(fragment) timing correlations of 128 implanted events. Other: 47 ms *10* (1999So20, earlier value from the same group as 2003So21, 2005Ga01). Weighted average of all three values is 55 ms *9*, using the lowest uncertainty in the dataset. Measured production cross section=2.8 nb (1992We04). Theoretical %β^-n=1.1 (1997Mo25).
1047 *4*	2$^+$†		BC	β_2(p,p′)=0.18 *+5−6* (2013Su20, inelastic scattering).
2038 *6*	(4$^+$)†		C	
2423? *18*	(≤3)‡		B	

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Adopted Levels, Gammas (continued)

^{58}Ti Levels (continued)

E(level)	J^π	XREF
2657 *7*	$(6^+)^\dagger$	C
2881 *27*	$(\leq 3)^\ddagger$	B

† From systematics of even-even nuclides, energy consistent with shell-model predictions (2013Su20,2014Ga07).

‡ No assignment has been proposed in 2013Su20, but it is unlikely that a level of spin higher than 3 is populated in (p,p′) scattering. As discussed by 2014Ga07, this is the possibly the reason that (4^+) and (6^+) levels reported in (^{61}V,^{58}Tiγ) reaction were not seen in the ^{1}H(^{58}Ti,^{58}Ti′) study.

γ(^{58}Ti)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π
1047	2^+	1047 *4*	100	0.0	0^+
2038	(4^+)	991 *4*		1047	2^+
2423?	(≤ 3)	1376† *18*		1047	2^+
2657	(6^+)	619 *5*		2038	(4^+)
2881	(≤ 3)	1835 *27*		1047	2^+

† Placement of transition in the level scheme is uncertain.

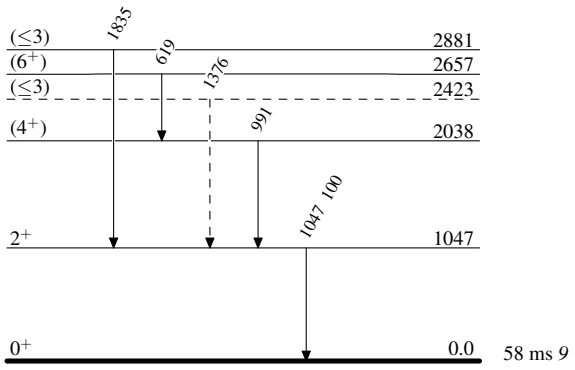
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{58}_{22}Ti_{36}$