^{123}Te(n,γ) E=thermal 2006Vo09,2000Do11,1995Ge06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. Katakura, Z. D. Wu	NDS 109, 1655 (2008)	1-Apr-2008

XUNDL data set compiled by M. Mitchell and B. Singh (McMaster) October 10, 2006 is consulted for level scheme construction.
2006Vo09: Measured Eγ, Iγ, $\gamma\gamma$ using two HPGe detectors. A large number (about 380) of coincidence gated spectra used to analyze the level scheme. Deduced S(n) and capture cross section.
2000Do11: enriched $^{123}TeO_2$ target; measured Doppler-shifted Eγ, Iγ and lifetime via Gamma Ray Induced Doppler broadening(GRID) technique by using the two-axis flat-crystal spectrometer GAMS4. deduced BE2. Compared with theory.
1995Ge06,1995Ge02: enriched target (70.4%), Ge detectors FWHM=2.3 keV at 1.3 MeV and 1.9 keV at 602 keV, primary and secondary γ's, $\gamma\gamma$ coin; natural target, Ge(Li) FWHM=6 keV at 1.3 MeV, primary γ's.
2005Su28: derivation of level density and radiative strength functions; no γ's data are given.
1994Va44: measured Eγ, Iγ; Ge(Li).
1988Pe06: half-life (2309-keV state), centroid shift.
1986Su11: enriched target (69%), α, electron spectrometer.
1983Ro13: enriched target, Ge(Li), $\gamma\gamma$ coin, $\gamma\gamma(\theta)$.
1969Bu05: enriched target (60.9%,45.8%) and natural abundance, bent crystal spectrometer, Ge(Li) anti-Compton spectrometer; FWHM=4-6 keV; energy calibration: E(^{15}N)=10.830 MeV, E(^{13}C)=4945 keV and known ^{124}Te γ rays.
Others: 1961Ba27: (7330γ)(1470γ)(θ); A_2=−0.41 *2*, A_4=−0.01 *8*; 1966Vo04: $\gamma\gamma$ coin; 1967Ze03: $\gamma\gamma$ coin.
The level scheme is based on that proposed by 2006Vo09 on the basis of $\gamma\gamma$ coin, unless otherwise indicated.
See ENSDF for gammas.

^{124}Te Levels

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	Comments
0.0	0^+		
602.7306 *10*	2^+		
1248.5843 *24*	4^+	1.4 ps *+14−5*	$T_{1/2}$: >0.76 ps, <4.6 ps (2000Do11).
1325.5163 *14*	2^+	1.04 ps *+21−14*	$T_{1/2}$: >0.76 ps, <2.4 ps (2000Do11).
1657.28 *7*	0^+	0.55 ps *+14−7*	$T_{1/2}$: >0.14 ps, <0.62 ps (2000Do11).
1746.91 *10*	6^+		
1882.85 *6*	0^+	0.76 ps *+21−14*	$T_{1/2}$: >0.42 ps, <4.4 ps (2000Do11).
1957.91 *5*	4^+		
2039.2961 *21*	3^+	0.55 ps *+14−7*	$T_{1/2}$: >0.21 ps, <0.97 ps (2000Do11).
2039.4247 *21*	2^+	0.49 ps *+14−7*	$T_{1/2}$: >0.05 ps, <1.25 ps (2000Do11).
2091.53 *4*	2^+	0.28 ps *7*	$T_{1/2}$: >0.14 ps, <0.69 ps (2000Do11).
2153.26 *7*	0^+		
2182.37 *6*	2^+		
2224.95 *8*	4^+		
2293.72 *4*	3^-		
2308.43 *10*	0^+	<0.25 ns	$T_{1/2}$: from 1988Pe06.
2322.95 *6*	2^+		
2335.09 *7*	5^-		
2349.62 *20*	6^+		
2454.05 *5*	2^+		
2483.32 *6*	4^+		
2512.00 *12*	4		
2521.26 *7*	2^+		
2529.42 *10*	1^+		
2593.98 *15*	5		
2601.03 *5*	1^+		
2618.62 *8*	(3)		
2641.24 *7*	2^+		
2681.47 *7*	2^+		
2693.74 *9*	3^-		

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^{123}Te(n,γ) E=thermal 2006Vo09,2000Do11,1995Ge06 (continued)

^{124}Te Levels (continued)

E(level)[†]	J^π[‡]	$T_{1/2}$[#]	Comments
2701.53 *6*	2^-		
2710.62 *8*	4^+		
2733.9 *3*	2^+ to 6^+		
2747.10 *5*	$1^{(-)}$		
2766.91 *9*	1^+ to 4^+		
2774.91 *8*	$3^-,4^-$		
2783.20 *8*	$1^+,2^+$		
2790.41 *9*	0^+ to 4^+		
2808.74 *7*	2^+		
2814.54 *8*	2^+ to 5^+		
2817.47 *8*	2^+		
2834.96 *6*	3^-		
2859.08 *10*	2,3		
2865.30 *12*	3^-		
2886.12 *7*	3^-		
2920.68 *10*	(3,4)		
2933.09 *22*	6		
2945.57 *6*	2^+		
2947.64 *12*	0^+ to 3^+		
2957.52 *7*	$3^-,4^+$		
2963.3 *7*	0^+ to 3^+		
2975.41 *11*	1		
2982.68 *9*	$2^+,3^+$		
2988.34 *6*	$1,2^+$		
3001.08 *6*	$2^+,3$		
3039.0 *7*	0^+ to 3^+		
3045.36 *6*	2^+		
3048.81 *21*	$1,2^+$		
3054.62 *9*	$3^-,4^+$		
3056.50 *10*	$2^+,3,4^+$		
3082.77 *10*	2^+ to 6^+		
3088.53 *7*	2^+		
3091.85 *8*	$1,2^+$		
3095.06 *6*	1^- to 4^+		
3100.91 *5*	$1,2^+$	1.04 ps *14*	$T_{1/2}$: >0.97 ps, <1.4 ps (2000Do11).
3107.60 *6*	$2^+,3,4^+$		
3109.38 *11*	$2^+,3,4^-$		
3118.52 *15*	$2^+,3^+$		
3143.23 *11*	0^+ to 3^+		
3162.93 *16*	$2^+,3,4^+$		
3167.93 *9*	$2^+,3,4^+$		
3210.9 *4*	2^+ to 6^+		
3212.25 *6*	$1^-,2^+$		
3217.59 *11*	2^+		
3220.37 *9*	2^+		
3235.4 *3*	0^+ to 4^+		
3238.18 *7*	$1,2^+$		
3240.88 *21*	$2^+,3,4^+$		
3257.98 *10*	$2^+,3,4^+$		
3279.94 *7*	$2^+,3,4^+$		
3284.23 *6*	2^+		
3288.90 *9*	$1,2^+$		
3308.5 *5*	2^+ to 6^+		
3318.97 *15*	0^+ to 4^+		
3336.51 *13*	$2^+,3^+,4^+$		
3348.70 *21*	$1,2^+$		

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^{123}Te(n,γ) E=thermal 2006Vo09,2000Do11,1995Ge06 (continued)

^{124}Te Levels (continued)

E(level)†	J$^\pi$‡
3355.2 *3*	2^+ to 6^+
3370.45 *12*	0^+ to 4^+
3393.59 *13*	$1^+,2^+$
3399.63 *9*	$2^+,3,4^+$
3429.95 *17*	$1^-,2,3^+$
3438.71 *21*	0^+ to 4^+
3443.00 *6*	$1,2^+$
3450.78 *9*	$1^-,2^+$
3456.62 *13*	$2^+,3,4^+$
3460.31 *20*	$1,2^+$
3474.65 *12*	0^+ to 4^+
3479.37 *9*	0^+ to 3^+
3487.29 *19*	$1,2^+$
3490.29 *11*	0^+ to 3^+
3497.55 *23*	2^+ to 6^+
3529.98 *8*	$1^-,2^+$
3537.68 *14*	$1,2^+$
3543.11 *7*	$1^-,2^+$
3576.00 *20*	$2^+,3^+,4^+$
3588.3 *3*	0^+ to 4^+
3599.3 *3*	$2^+,3,4^+$
3622.11 *8*	$1^-,2^+$
3628.48 *8*	$1,2^+$
3652.81 *10*	$1,2^+$
3654.7 *3*	2^+
3662.00 *13*	$2^+,3,4^+$
3666.92 *10*	1^+ to 3^+
3685.70 *13*	0^+ to 4^+
3709.76 *7*	2^+
3723.63 *16*	$2^+,3,4^+$
3755.71 *6*	$1,2^+$
3774.6 *4*	$1,2^+$
3805.42 *13*	0^+ to 3^+
3810.08 *11*	0^+ to 3^+
3853.51 *11*	0^+ to 3^+
3862.48 *12*	0^+ to 3^+
3880.17 *17*	$1,2^+$
3884.83 *10*	$1,2^+$
3904.10 *15*	0^+ to 3^+
3929.53 *10*	$1,2^+$
3945.22 *22*	$1,2^+$
3946.40 *18*	$1,2^+$
3967.34 *11*	$1^-,2^+$
3987.9 *5*	0^+ to 3^+
3996.34 *14*	0^+ to 4^+
3998.50 *20*	$1,2^+$
4010.93 *11*	$1,2^+$
4030.3 *3*	0^+ to 3^+
4043.86 *14*	0^+ to $3^{(-)}$
4051.50 *11*	0^+ to 3^+
4057.22 *18*	0^+ to 4^+
4090.11 *14*	$1,2^+$
4099.65 *13*	0^+ to 3^+
4114.37 *13*	0^+ to 4^+
4128.2 *3*	$1,2^+$
4142.20 *13*	$2^+,3,4^+$
4144.52 *15*	0^+ to $3^{(-)}$
4146.40 *15*	$1,2^+$
4155.38 *13*	2^+ to 6^+
4170.9 *3*	$1,2^+$
4177.75 *22*	$1,2^+$
4195.06 *19*	1,2
4216.0 *3*	$1,2^+$
4229.16 *19*	$1,2^+$
4238.6 *7*	0^+ to 4^+
4244.31 *11*	0^+ to 3^+
4269.76 *22*	$1,2^+$
4289.47 *9*	2^+
4302.57 *21*	0 to 3^+
4324.3 *3*	$1,2^+$
4327.02 *19*	$1,2^+$
4375.47 *15*	0^+ to 4^+
4379.15 *7*	0^+ to 3^+
4415.31 *16*	0^+ to 3^+
4439.3 *4*	0^+ to $3^{(-)}$
4444.8 *5*	0^+ to 3^+
4453.71 *17*	0^+ to 3^+
4487.65 *18*	$1,2^+$
4501.01 *10*	0^+ to 3^+
4505.61 *23*	0 to 2
4524.5 *3*	0^+ to 3^+
4527.75 *21*	0^+ to 3^+
4551.39 *24*	$1,2^+$
4568.88 *14*	$1,2^+$
4580.47 *14*	$1,2^+$
4598.61 *24*	$1,2^+$
4630.34 *19*	$1,2^+$
4643.31 *23*	$1,2^+$
4699.14 *23*	$1,2^+$
4701.95 *21*	0^+ to 4^+
4712.72 *16*	0^+ to 3^+
4723.4 *3*	0^+ to 3^+
4737.29 *21*	0^+ to 4^+
4739.69 *12*	$1,2^+$
4754.64 *17*	$1,2^+$
4764.74 *23*	$1,2^+$
4812.83 *20*	0^+ to 3^+
4818.27 *17*	0^+ to 3^+
4883.66 *13*	$1,2^+$
4889.36 *15*	$1,2^+$
4897.82 *18*	0^+ to 3^+
4911.29 *15*	$2^+,3^+$
4915.6 *3*	$1,2^+$
4932.41 *20*	0^+ to 3^+
4940.82 *16*	$1,2^+$
4962.50 *16*	0^+ to 3^+
4979.25 *12*	0^+ to 3^+
4985.1 *3*	0^+ to 3^+
4990.4 *3*	0^+ to 3^+
4993.49 *21*	$1,2^+$
5036.92 *13*	$1,2^+$
5050.70 *23*	$1,2^+$

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^{123}Te(n,γ) E=thermal 2006Vo09,2000Do11,1995Ge06 (continued)

^{124}Te Levels (continued)

E(level)†	J$^{\pi}$‡	Comments
5075.93 *21*	1,2^{+}	
5127.29 *19*	0^{+} to 4^{+}	
5131.8 *6*	1,2^{+}	
5155.88 *13*	1,2^{+}	
5169.60 *12*	1,2^{+}	
5285.5 *6*	0^{+} to 4^{+}	
5320.28 *12*	0^{+} to 3^{+}	
5423.9 *4*	0^{+} to 3^{+}	
5445.85 *24*	1,2^{+}	
5488.66 *16*	1,2^{+}	
5750.99 *16*	0^{+} to 3^{+}	
(9424.519 *25*)	1^{+},0^{+}	E(level): statistical uncertainty=0.025 keV, systematic uncertainty=0.1 keV. S(n)=9423.97 *17* (2003Au03, mass evaluation). J$^{\pi}$: s-wave capture in ^{123}Te, g.s. J^{π}=1/2^{+}. The 0^{+} component is estimated as 0.7% by 2006Vo09.

† Least-squares fits of Eγ's based on the level scheme of 1995Ge06.

‡ From Adopted Levels, unless otherwise noted. 2006Vo09 gives J$^{\pi}$ values without any discussions.

\# From Doppler broadening (GRID technique) (2000Do11), unless otherwise indicated. Value given corresponds to minimum χ^2; upper and lower limits are listed under comments.

$\gamma(^{124}$Te)

Iγ normalization: From 2006Vo09.
α(K)exp values are from 1986Su11 normalized so that the α(K)exp of 558-keV transition is that of E2 theory (0.00508).

$\gamma\gamma(\theta)$ data (1983Ro13)

cascade	B2	B4	cascade	B2	B4
646 - 602	-0.185 *68*	-0.030 *43*	1489 - 602	-0.25 *19*	0.06 *9*
723 - 602	-0.235 *50*	-0.243 *35*	1580 - 602	-0.33 *22*	-0.00 *13*
1054 - 602	-0.70 *26*	-1.02 *16*	1691 - 602	-0.03 *25*	-0.17 *18*
558 - 722	-0.09 *55*	-1.56 *52*	1707 - 602	-0.62 *77*	-0.84 *38*
709 - 645	-0.40 *37*	1.48 *68*	1720 - 602	-0.20 *25*	-0.04 *16*
709-(645)-602	-0.52 *63*	0.38 *43*	1369 - 722	0.21 *91*	-0.86 *96*
714 - 722	0.39 *19*	0.40 *25*	1386 - 722	-1.1 *17*	-1.9 *10*
791 - 645	1.00 *77*	0.28 *67*	1510 - 722	-0.20 *49*	-1.32 *83*
1437 - 602	0.12 *26*	-0.20 *10*			

B2 and B4 values are the directional distribution coefficients for the first γ ray
1386-keV γ is not observed in 1995Ge06

ce data (1986Su11)

transition	10^3 α(exp)	transition	10^3 α(exp)
557.7	K 5.08 *22*	1354.8	K 0.58 *20*
645.9	K 3.40 *14*	1369.6	K 0.61 *21*
709.4	K 3.50 *25*	1386.0	K 0.42 *14*
713.7	K 3.9 *3*	1436.9	K 0.81 *14*
	L 0.47 *8*		L 0.09 *3*
722.8	K 3.81 *16*	1463.2	K 0.42 *23*
	L 0.43 *10*	1488.9	K 0.76 *6*
767.4	K 1.2 *6*		L 0.09 *2*
775.2	K 1.6 *4*	1509.5	K 0.34 *16*
790.6	K 1.9 *3*	1579.7	K 0.73 *8*
828.1	K 2.4 *8*		L 0.10 *4*
	L 0.38 *20*	1690.9	K 0.24 *9*
857.2	K 1.8 *8*	1706.7	K 0.35 *9*
976.4	K 2.4 *12*	1720.7	K 0.51 *12*
1054.3	K 0.96 *17*	1918.9	K 0.34 *10*
	L 0.10 *5*	1927.2	K 0.31 *16*
1325.6	K 0.70 *7*	2039.0	K 0.31 *12*
	L 0.08 *4*	2746.4	K 0.10 *6*

α(exp) values are normalized to the theoretical value of E2 character for 557.54-keV transition.

$^{124}_{52}Te_{72}$-5