^{29}Si(n,γ) E=thermal 1992Ra19,1990Is02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia, A. Chakraborty	NDS 197,1 (2024)	31-May-2024

Others: 1970Be48, 1970Sp02, 1974Sp04.

1992Ra19: Target: 5.73% enriched ^{29}Si; E_n=Thermal; Measured Eγ, Iγ with Compton suppressed HPGe mode or pair spectrometer mode.

1990Is02: Target: High-purity quartz (SiO_2) rod; E_n=Thermal; Measured Eγ (>2235 keV), Iγ with pair spectrometer.

2007ChZX: provides an evaluation of experimental data (n,γ), E=thermal from Budapest reactor, natural silicon target; Ge(Li) detector, measured Eγ, Iγ; (taken from the EGAF section of the Cd that is part of this publication). Supersedes 2003ChZS. The reported γ-ray energies and intensities of 2007ChZX are statistically consistent with those of 1992Ra19 and 1990Is02 (discrepant data noted), however, less precise datum are not included in weighted average.

^{30}Si Levels

E(level)†	J$^\pi$‡	Comments
0	0$^+$	
2235.311 *23*	2$^+$	
3498.51 *4*	2$^+$	
3769.49 *4*	1$^+$	
3787.71 *5*	0$^+$	
4810.34 *11*	2$^+$	
4830.84 *4*	3$^+$	
5231.56 *7*	3$^+$	
5372.2 *6*	0$^+$	
5487.56 *6*	3$^-$	
5614.04 *12*	2$^+$	
6641.20 *6*	2$^-$	
6744.06 *3*	1$^-$	
6914.78 *19*	2$^+$	
7507.86 *4*	(2$^-$)	
7667.2 *4*	(1,2)$^+$	
8104.9 *3*	(2$^+$,3$^+$)	
8154.83 *25*	(1,2)	
8163.18 *4*	1$^-$	J$^\pi$: from 1974Sp04, (pol n,γ),(n,γ).
8898.08 *10*	1$^-$	
8936.5 *3*		E(level): 8938 keV in the Adopted Levels.
8953.29 *12*	(1,2)	
9103.73 *4*	(1,2)$^-$	
9308.07 *6*		
9597.17 *9*		
9619.75 *6*	(1$^-$)	
9792.34 *6*	1$^-$	
10202.09 *8*	(1$^-$)	
10275.8 *3*		
10609.20 *2*	(0$^+$,1$^+$)	E(level): from neutron separation energy (2021Wa16). Other: 10609.5 *7* (1970Sp02). 3865γ, 3101γ, and 2446γ to 1$^-$, 2$^-$, 1$^-$ states, respectively. J^π=(1$^+$,2$^+$) in 1990Is02.

† From a least squares fit to the γ-ray energies.

‡ From the Adopted Levels, except where noted.

^{29}Si(n,γ) E=thermal 1992Ra19,1990Is02 (continued)

γ(^{30}Si)

E_γ[†]	I_γ[&b]	E_i(level)	J^π_i	E_f	J^π_f	σ (mb)[a]	Comments
271.0[c]	<0.04	3769.49	1^+	3498.51	2^+	<0.05	
289.2[c]	<0.04	3787.71	0^+	3498.51	2^+	<0.05	
[x]295.7 *4*	0.03 *1*					0.04 *1*	
[x]326.0 *4*	0.08 *2*					0.10 *2*	
333.3 *3*	0.11 *3*	10609.20	$(0^+,1^+)$	10275.8		0.13 *3*	
[x]355.80 *8*	0.29 *3*					0.34 *3*	
400.9 *4*	0.05 *2*	5231.56	3^+	4830.84	3^+	0.06 *2*	
407.14 *7*	0.31 *3*	10609.20	$(0^+,1^+)$	10202.09	(1^-)	0.37 *3*	
421.0 *5*	0.06 *2*	5231.56	3^+	4810.34	2^+	0.07 *2*	
[x]646.8 *3*	0.10 *2*					0.12 *2*	
[x]692.5 *5*	0.08 *2*					0.10 *2*	
816.87 *5*	1.09 *5*	10609.20	$(0^+,1^+)$	9792.34	1^-	1.30 *6*	
989.45 *5*	1.06 *5*	10609.20	$(0^+,1^+)$	9619.75	(1^-)	1.26 *6*	
998.9 *3*	0.25 *3*	9103.73	$(1,2)^-$	8104.9	$(2^+,3^+)$	0.30 *3*	
1012.05 *9*	0.82 *4*	10609.20	$(0^+,1^+)$	9597.17		0.98 *5*	
1022.6[c]	<0.03	4810.34	2^+	3787.71	0^+	<0.04	
1027.1[c]	<0.03	6641.20	2^-	5614.04	2^+	<0.04	
1040.9[c]	<0.03	4810.34	2^+	3769.49	1^+	<0.04	
1061.3[c]	<0.03	4830.84	3^+	3769.49	1^+	<0.04	
1153.61 *13*	0.45 *3*	6641.20	2^-	5487.56	3^-	0.54 *4*	
(1248.0)	0.13 *6*	8163.18	1^-	6914.78	2^+	0.15 *7*	
1263.18[@] *6*	5.51 *17*	3498.51	2^+	2235.311	2^+	6.56 *20*	I_γ: others: 9.5 *20* per 100 neutron captures (2007ChZX).
1301.12 *5*	1.52 *5*	10609.20	$(0^+,1^+)$	9308.07		1.81 *6*	
1311.80 *14*	0.40 *3*	4810.34	2^+	3498.51	2^+	0.48 *4*	
1332.48 *16*	0.29 *3*	4830.84	3^+	3498.51	2^+	0.34 *4*	
1390.3 *5*	0.06 *2*	8898.08	1^-	7507.86	(2^-)	0.07 *2*	
1409.6[c]	<0.03	6641.20	2^-	5231.56	3^+	<0.04	
1462.0[c]	<0.03	5231.56	3^+	3769.49	1^+	<0.04	
[x]1469.2 *4*	0.14 *3*					0.17 *3*	
1505.46[@] *4*	3.79 *12*	10609.20	$(0^+,1^+)$	9103.73	$(1,2)^-$	4.51 *14*	
1534.12[@] *4*	5.52 *17*	3769.49	1^+	2235.311	2^+	6.57 *20*	
1552.36[@] *4*	3.61 *11*	3787.71	0^+	2235.311	2^+	4.30 *13*	I_γ: 6.3 *14* per 100 neutron captures (2007ChZX).
1602.8[@] *9*	0.08 *3*	5372.2	0^+	3769.49	1^+	0.10 *3*	I_γ: 8.9 *19* per 100 neutron captures (2007ChZX).
1655.89 *12*	0.70 *4*	10609.20	$(0^+,1^+)$	8953.29	(1,2)	0.83 *5*	
1672.7 *3*	0.27 *3*	10609.20	$(0^+,1^+)$	8936.5		0.32 *3*	
1711.3 *3*	4.2 *8*	10609.20	$(0^+,1^+)$	8898.08	1^-	5 *1*	
1733.0 *1*	1.11 *5*	5231.56	3^+	3498.51	2^+	1.32 *6*	
1810.42 *22*	0.45 *3*	6641.20	2^-	4830.84	3^+	0.54 *4*	
1830.6 *4*	0.23 *3*	6641.20	2^-	4810.34	2^+	0.27 *4*	
1844.40 *16*	0.52 *4*	5614.04	2^+	3769.49	1^+	0.62 *5*	
1893.6 *5*	0.16 *3*	7507.86	(2^-)	5614.04	2^+	0.19 *4*	
1933.9 *5*	0.18 *3*	6744.06	1^-	4810.34	2^+	0.22 *4*	
1989.02 *7*	1.06 *5*	5487.56	3^-	3498.51	2^+	1.26 *6*	
2020.33 *23*	1.27 *5*	7507.86	(2^-)	5487.56	3^-	1.51 *6*	
2154.3 *6*	0.12 *3*	8898.08	1^-	6744.06	1^-	0.14 *3*	
2235.23[@] *3*	45.6 *13*	2235.311	2^+	0	0^+	54.3 *16*	
2256.7 *4*	0.21 *3*	8898.08	1^-	6641.20	2^-	0.25 *4*	
2276.22 *8*	1.24 *6*	7507.86	(2^-)	5231.56	3^+	1.48 *7*	
2359.57 *4*	3.52 *11*	9103.73	$(1,2)^-$	6744.06	1^-	4.19 *13*	
2445.94[@] *3*	7.9 *3*	10609.20	$(0^+,1^+)$	8163.18	1^-	9.4 *3*	

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^{29}Si(n,γ) E=thermal 1992Ra19,1990Is02 (continued)

γ(^{30}Si) (continued)

E_γ[†]	I_γ[&b]	E_i(level)	J^π_i	E_f	J^π_f	σ (mb)[a]	Comments
2454.5 *3*	0.25 *3*	10609.20	(0+,1+)	8154.83	(1,2)	0.30 *3*	
2504.3[c]	<0.03	10609.20	(0+,1+)	8104.9	(2+,3+)	<0.04	
2574.8 *5*	0.13 *3*	4810.34	2+	2235.311	2+	0.15 *4*	
2595.39 *4*	2.81 *8*	4830.84	3+	2235.311	2+	3.35 *10*	
(2667.0 *6*)	0.05 *2*	8154.83	(1,2)	5487.56	3−	0.06 *2*	
2667.0 *6*	0.13 *3*	9308.07		6641.20	2−	0.16 *4*	
2676.87[@] *6*	2.18 *9*	7507.86	(2−)	4830.84	3+	2.59 *11*	I_γ: 5.5 *13* per 100 neutron captures (2007ChZX).
[x]2747.6 *5*	0.11 *3*					0.13 *3*	
2871.6 *3*	0.34 *4*	6641.20	2−	3769.49	1+	0.40 *5*	
2941.9 *5*	0.18 *3*	10609.20	(0+,1+)	7667.2	(1,2)+	0.22 *3*	
2956.25 *12*	1.09 *6*	6744.06	1−	3787.71	0+	1.30 *7*	
2996.2 *9*	0.12 *3*	5231.56	3+	2235.311	2+	0.14 *3*	
3101.19[@] *3*	23.7 *8*	10609.20	(0+,1+)	7507.86	(2−)	28.2 *9*	
3136.6 *7*	0.13 *3*	5372.2	0+	2235.311	2+	0.15 *4*	
3142.5[c]	<0.06	6641.20	2−	3498.51	2+	<0.07	
3145.1[c]	<0.05	6914.78	2+	3769.49	1+	<0.06	
3252.00 *9*	1.10 *5*	5487.56	3−	2235.311	2+	1.31 *6*	
3283.8 *3*	0.36 *4*	8898.08	1−	5614.04	2+	0.43 *5*	
3294.9 *9*	0.05 *2*	8104.9	(2+,3+)	4810.34	2+	0.06 *2*	
3378.68 *25*	0.38 *4*	5614.04	2+	2235.311	2+	0.45 *5*	
3415.7 *7*	0.13 *3*	6914.78	2+	3498.51	2+	0.16 *4*	
3498.33[@] *5*	5.42 *17*	3498.51	2+	0	0+	6.45 *20*	
3693.8[c]	<0.08	9308.07		5614.04	2+	<0.10	
3694.2 *3*	1.10 *6*	10609.20	(0+,1+)	6914.78	2+	1.31 *7*	
3738.20 *18*	1.71 *8*	7507.86	(2−)	3769.49	1+	2.04 *10*	
3769.22[@] *5*	4.70 *14*	3769.49	1+	0	0+	5.59 *17*	
(3787.6)		3787.71	0+	0	0+		
3864.89[@] *3*	29.8 *9*	10609.20	(0+,1+)	6744.06	1−	35.5 *11*	I_γ: 42 *6* per 100 neutron captures (2007ChZX).
3967.78[@] *9*	3.95 *13*	10609.20	(0+,1+)	6641.20	2−	4.70 *15*	I_γ: 6.3 *17* per 100 neutron captures (2007ChZX).
4009.09[‡] *21*	0.93 *4*	7507.86	(2−)	3498.51	2+	1.11 *5*	
4087.6 *5*	0.34 *3*	8898.08	1−	4810.34	2+	0.40 *4*	
4168.4[c]	<0.05	7667.2	(1,2)+	3498.51	2+	<0.06	
4375.18 *15*	1.22 *5*	8163.18	1−	3787.71	0+	1.45 *6*	
4393.43 *23*	0.71 *4*	8163.18	1−	3769.49	1+	0.84 *5*	
4405.56[@] *8*	2.91 *9*	6641.20	2−	2235.311	2+	3.46 *11*	I_γ: 7.4 *20* per 100 neutron captures (2007ChZX).
4508.64 *17*	0.66 *4*	6744.06	1−	2235.311	2+	0.79 *5*	
(4656)	0.06 *2*	8154.83	(1,2)	3498.51	2+	0.07 *2*	
4664.36 *12*	1.13 *4*	8163.18	1−	3498.51	2+	1.35 *5*	
4679.2 *3*	0.43 *3*	6914.78	2+	2235.311	2+	0.51 *4*	
4766.7 *7*	0.10 *3*	9597.17		4830.84	3+	0.12 *3*	
4786.5 *8*	0.08 *3*	9597.17		4810.34	2+	0.10 *3*	
4810.0 *3*	0.45 *3*	4810.34	2+	0	0+	0.54 *4*	
4994.9 *7*	0.27 *4*	10609.20	(0+,1+)	5614.04	2+	0.32 *5*	
5128.18[#] *17*	1.64 *7*	8898.08	1−	3769.49	1+	1.95 *8*	
5272.09[‡] *7*	15.8 *5*	7507.86	(2−)	2235.311	2+	18.8 *6*	
5398.8 *4*	0.40 *5*	8898.08	1−	3498.51	2+	0.48 *6*	
5431.5 *6*	0.17 *3*	7667.2	(1,2)+	2235.311	2+	0.20 *4*	
5538.05 *24*	0.80 *5*	9308.07		3769.49	1+	0.95 *6*	
5868.8 *7*	0.18 *3*	8104.9	(2+,3+)	2235.311	2+	0.21 *4*	

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^{29}Si(n,γ) E=thermal 1992Ra19,1990Is02 (continued)

γ(^{30}Si) (continued)

E_γ[†]	I_γ[&b]	E_i(level)	J^π_i	E_f	J^π_f	σ (mb)[a]	Comments
5920.2 *7*	0.13 *3*	8154.83	(1,2)	2235.311	2^+	0.16 *4*	
5927.24 *15*	1.34 *7*	8163.18	1^-	2235.311	2^+	1.60 *8*	
6004.4 *9*	0.07 *3*	9792.34	1^-	3787.71	0^+	0.08 *3*	
6098.0 *3*	0.53 *5*	9597.17		3498.51	2^+	0.63 *6*	
6487.0 *7*	0.10 *3*	10275.8		3787.71	0^+	0.12 *3*	
6640.7 *9*	0.14 *4*	6641.20	2^-	0	0^+	0.17 *5*	
6662.00 *25*	1.04 *5*	8898.08	1^-	2235.311	2^+	1.24 *6*	
6717.3 *8*	0.24 *4*	8953.29	(1,2)	2235.311	2^+	0.29 *5*	
6743.22[@] *4*	30.7 *9*	6744.06	1^-	0	0^+	36.6 *11*	I_γ: 43 *7* per 100 neutron captures (2007ChZX).
6820.7 *4*	1.08 *8*	10609.20	(0^+,1^+)	3787.71	0^+	1.28 *9*	
6838.77[‡@] *9*	3.68 *13*	10609.20	(0^+,1^+)	3769.49	1^+	4.38 *16*	
6913.7 *5*	0.34 *5*	6914.78	2^+	0	0^+	0.40 *6*	
7071.8 *7*	0.15 *5*	9308.07		2235.311	2^+	0.18 *4*	
7109.82 *7*	5.02 *15*	10609.20	(0^+,1^+)	3498.51	2^+	5.98 *18*	
7507.4 *8*	0.14 *3*	7507.86	(2^-)	0	0^+	0.17 *4*	
(7666)	0.020 *7*	7667.2	$(1,2)^+$	0	0^+	0.024 *8*	
[x]7944.5 *9*	0.06 *2*					0.07 *2*	
7965.8 *9*	0.06 *2*	10202.09	(1^-)	2235.311	2^+	0.07 *2*	
8162.01[‡] *11*	2.93 *10*	8163.18	1^-	0	0^+	3.49 *12*	
8372.7 *3*	0.66 *5*	10609.20	(0^+,1^+)	2235.311	2^+	0.79 *6*	
8896.7[‡] *3*	0.50 *5*	8898.08	1^-	0	0^+	0.60 *6*	
8951.9 *5*	0.27 *3*	8953.29	(1,2)	0	0^+	0.32 *4*	
9618.08[‡] *13*	1.02 *5*	9619.75	(1^-)	0	0^+	1.22 *6*	
9790.5[‡] *3*	0.93 *5*	9792.34	1^-	0	0^+	1.11 *6*	
10200.6[‡] *6*	0.24 *3*	10202.09	(1^-)	0	0^+	0.28 *3*	
10607.17[‡@] *8*	6.73 *21*	10609.20	(0^+,1^+)	0	0^+	8.01 *25*	

[†] From 1992Ra19, except otherwise noted.
[‡] Weighted average of 1992Ra19 and 1990Is02.
[#] From 1990Is02.
[@] Also reported by 2007ChZX.
[&] Per 100 neutron capture, obtained by multiplying the reported γ-ray cross section data by 0.840 as stated in 1992Ra19.
[a] From 1992Ra19.
[b] Intensity per 100 neutron captures.
[c] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.