^{208}Pb(α,^{3}He) 1975Ti02,1986Ma49,1981Pe10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. Chen # and F. G. Kondev	NDS 126, 373 (2015)	30-Sep-2013

Target ^{208}Pb target $J^\pi=0^+$.

1975Ti02: E=58 MeV α beam was produced from the University of Michigan 83-inch cyclotron. A 98% enriched self-supporting 1.5 mg/cm^2 ^{208}Pb target was used. Reaction products were detected by an array of position-sensitive detectors on the focal plane of a magnetic spectrograph, FWHM≈50 keV (estimated by evaluator). Measured $\sigma(\theta)$. Deduced levels, spectroscopic factors from DWBA analysis.

1986Ma49: E=183 MeV α beam was produced from the K220 Orsay synchrocyclotron. A 10 mg/cm^2 99.9% enriched ^{208}Pb target was used. Reaction products were detected by two multiwire proportional chambers at the focal plane of a large magnetic spectrometer, FWHM=200 keV. Measured $\sigma(\theta)$. Deduced levels, strength functions.

1981Pe10: E=61.5 and 81.5 MeV beams were produced from the University of Maryland Isochronous Cyclotron. Target was 1 mg/cm^2 99% enriched ^{208}Pb evaporated onto a 10 μg/cm^2 carbon backing. Reaction products were detected by two telescopes of a silicon ΔE detector and a Si(Li) E detector, FWHM<100 keV for E=61 MeV, 150 keV for E=81 MeV. Measured $\sigma(\theta)$. Deduced levels, spectroscopic factors from DWBA analysis.

Others: 1999Ah01, 1984Ga37.

^{209}Pb Levels

E(level)[†]	L[‡]	S[@]
0.0		0.94[a]
781 *8*		1.05[b]
1426 *8*		0.57[c]
2520[&]		0.93[d]
3050 *14*		0.062[c]
3550 *14*		0.032[c]
3715 *14*		0.028[c]
3934 *14*	6,7,8[#]	
4211 *14*	6,7,8[#]	

[†] From 1975Ti02. In addition to the resolved peaks in the range 0 to 4.2 MeV, 1986Ma49 also study the region from 4.5 to 15 MeV, in which region the spectrum is dominated by a wide bump at about 10.7 MeV. On the basis of $\sigma(\theta)$ and C^{2}S for several energy slices in this region, the authors suggest that the enhanced cross section is due to neutron stripping to high-spin states with neutron number n>185, namely, $2h_{11/2}$, $1j_{13/2}$, and $1k_{17/2}$.

[‡] Values reported in (α,^{3}He) by 1986Ma49 and 1975Ti02 (for the first three states) agree with the (d,p) values, but the shapes for adjacent L values are not sufficiently different to yield unique L assignments.

[#] Fit consistent with L=8 (possible $1k_{17/2}$) as suggested by core-particle model, however, fit is equally good for L=7 (possible $1j_{15/2}$) and for L=6 (although not considered by authors), so a unique L value cannot be assigned. L=6 is assigned to a level at 3937 *5* in (p,d).

[@] From 1975Ti02 (except 2520 level) calculated using local zero-range DWBA with normalization factor=50 and neutron parameters radius=1.275 fm, diffuseness=0.65 fm, and spin-orbit coupling strength=25. Neutron well depth chosen based on separation energy approximation. 1986Ma49 report values in good agreement with those of 1975Ti02 except for S(g.s.)=0.69. 1981Pe10 report values for the first three states of 0.86, 0.69, and 0.98 at E=61, and somewhat lower values (8 to 16%) for E=81. The results of these authors for S(781 and 1426 levels) do not agree with those of the other authors in (α,^{3}He) or of other single particle transfer reactions.

[&] From 1986Ma49. Peak is masked by impurities in spectrum of 1975Ti02.

[a] For configuration=$\nu(2g_{9/2})^{+1}$.

[b] For configuration=$\nu(1i_{11/2})^{+1}$.

[c] For configuration=$\nu(1j_{15/2})^{+1}$.

[d] For configuration=$\nu(2g_{7/2})^{+1}$, from 1986Ma49.