⁹⁷Mo(³He,d) 1976Ma16

History						
Туре	Author	Citation	Literature Cutoff Date			
Full Evaluation	Jun Chen, Balraj Singh	NDS 164, 1 (2020)	15-Feb-2020			

 $J^{\pi}(^{97}\text{Mo g.s.})=5/2^+$.

1976Ma16: E=24 MeV ³He beam was produced from the McMaster FN tandem accelerator. Target was 50 μ g/cm² ⁹⁷Mo (94% enriched) evaporated on a 50 μ g/cm² carbon foil. Deuterons were momentum-analyzed with an Engel magnetic spectrograph (FWHM=15 keV) and detected with photographic emulsions. Measured $\sigma(\theta)$ from 7.5° to 45°. Deduced levels, J, π , L-transfers, spectroscopic factors from DWBA analysis. Comparisons with available data.

1976Fi04: E=23 MeV beam from ANL tandem accelerator and E=19 MeV beam from the University of Pittsburgh tandem. Target was 0.24 mg/cm² ⁹⁷Mo foil. Reaction products were momentum-analyzed with Engel split-pole spectrograph and detected in photographic emulsions. Measured $\sigma(\theta)$ from 8° to 28°. Deduced levels, J, π , L-transfers from DWBA analysis. See also 1974Co27 for measured Q value from the same experiments. 1976Fi04 report data primarily on ⁹⁸Mo(p,n γ).

Additional information 1.

Q value for (³He,d)=686 *10* (1976Ma16), 680 8 (1974Co27).

All data are from 1976Ma16, unless otherwise noted.

⁹⁸Tc Levels

Spectroscopic strength $G=(2J_f+1)/(2J_i+1)\times C^2S$, where J_f and J_i are spins of the initial and final states, respectively.

E(level)	$J^{\pi \ddagger}$	_L#	G ^{#d}	Comments
0	$(6,7)^+$	4 ^{@c}	2.10	
21 3	(5,6,7)+	4 [@] c	1.92	E(level): other: 26 (1976Fi04).
66 4	$(3,4,5)^+$	4 [@] c	0.87	E(level): other: 69 (1976Fi04).
83 4	(2,3)+	4 [@]	0.50	E(level): a peak around this energy can be seen in deuteron spectrum at 8° in Fig.3 of 1976Fi04 but is not labeled.
106 <i>3</i>	$(6,7)^+$	4 [@] c	1.89	E(level): suggested as a doublet (104+106) by 1976Fi04.
138 <i>3</i>	(2)-	1&c	0.18	E(level): weighted average of 136 3 (1976Ma16) and 139 3 (1976Fi04). 1976Fi04 state that the 139 level is not resolved from a neighboring level at 148. J^{π} : (3) ⁻ in Adopted Levels.
190†				
201 4		(4+2) ^{<i>a</i>}		E(level): other: 206 (1976Fi04).
266 4		(4+2) ^b		E(level): other: 270 (1976Fi04).
326 5		(4+2) ^b		E(level): other: 323 (1976Fi04).
347 <i>3</i>	$(3)^{-}$	$1^{\&c}$	0.22	E(level): other: 351 (1976Fi04).
387 4	$(2,3)^+$	4 [@]	0.43	E(level): other: 393 (1976Fi04).
425 6 454 [†]		2	0.02	E(level): other: 424 (1976Fi04).
544†		(1)		L: from 1976Fi04 for this weak peak.

[†] From (³He,d) spectrum in Fig.3 shown by 1976Fi04.

[‡] Tentative assignments from 1976Ma16 based on L-transfers.

[#] From DWBA analysis of measured $\sigma(\theta)$ (1976Ma16).

^(a) Suggested configuration= $\pi 1g_{9/2} \otimes \nu 2d_{5/2}^{-1}$, $J^{\pi} = 2^+$ to 7⁺.

[&] Suggested configuration= $\pi 2p_{1/2} \otimes \nu 2d_{5/2}^{-1}$, $J^{\pi}=2^{-}$, 3⁻.

^a Consistent with L=4 shape with a small L=2 admixture.

^b Consistent with L=4 with a large L=2 admixture.

^c Also from DWBA analysis in 1976Fi04.

^d Spectroscopic strength $G=(2J_f+1)/(2J_i+1)\times C^2S$ is defined by $\sigma(exp)=4.42\times G\times \sigma(DWBA)/(2j+1)$, where J_f and J_i are spins of the

⁹⁷Mo(³He,d) **1976Ma16** (continued)

⁹⁸Tc Levels (continued)

initial and final states, respectively, j the total angular momentum of transferred particle, C²S the spectroscopic factor. Quoted values are normalized to G=0.089 for the $3/2^-$, 509 level in ⁹⁹Tc from ⁹⁸Mo(³He,d) reaction which is present in the ⁹⁷Mo(³He,d) spectra. The uncertainties are $\approx 15\%$ for relative strengths and in the order of 50% for absolute strengths (1976Ma16).