

¹⁹²Os(t,α),(pol t,α) 1976Hi08,1977Hi06

Type	Author	History Citation	Literature Cutoff Date
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1976Hi08 and 1977Hi06 are from the same research group.

1976Hi08: (t,α) – target: 98.7% enriched ¹⁹²Os; E=15 MeV; FWHM=8 to 12 MeV; spectrometer: magnetic; θ=30°, 40°, and 50° (1976Hi08). FWHM 8 to 12 keV.

1977Hi06: (pol t,α) – target: 99.1% enriched ¹⁹²Os; E=17 MeV with a polarization of 0.75; FWHM≈20 keV; spectrometer: magnetic; θ=15° to 50°, in steps of 5° (1977Hi06). FWHM ~20 keV.

¹⁹¹Re Levels

E(level) [†]	J ^π [‡] _e	T _{1/2}	S [#]	Comments
0.0 [@] 3	(3/2 ⁺ ,1/2 ⁺)	9.8 min 5		Probable doublet comprised of J=1/2 and J=3/2 members of the 1/2[411] rotational band. T _{1/2} : From Adopted Levels. Analyzing power indicates probable J=5/2.
27 3				
97 ^{&} 3	5/2 ⁺		0.65	5/2 ⁺ state is the g.s. in odd-mass Re isotopes with A≥179.
145 ^a 3	(9/2 ⁻)		0.09	
227 [@] 3	(5/2 ⁺ ,7/2 ⁺)			Doublet comprised of the J=5/2 and 7/2 members of the 1/2[411] band. Transition strength relative to g.s. doublet agrees well with experimental values in ¹⁸⁷ Re and ¹⁸⁹ Re, but it disagrees with the theoretical value.
254 ^d 3				
264 ^d 3				
285 ^a 3	11/2 ⁻		2.73	Strongly populated.
299 ^d 3				
449 3	(1/2 ⁺)		0.13	Possible vibrational state analogous to the 512-keV state in ¹⁸⁷ Re, although the transition strength is twice that of ¹⁹¹ Re.
521 3	(5/2 ⁺)		0.10	
550 ^d 3				
555 ^d 3				
606 3	(1/2 ⁻ ,3/2 ⁺ ,5/2 ⁻)		0.09	
622 ^d 3				
627 ^d 3				
741 3	(7/2 ⁻ ,9/2 ⁺ ,11/2 ⁻)			
758 ^d 3				
799 ^b 3	7/2 ⁺		0.70	
832 3	(9/2 ⁺)			
858 3	(3/2 ⁻ ,5/2 ⁺)		0.08	
876 ^d 3				
1004 ^d 3				
1015 ^d 3				
1064 3	(3/2 ⁺)		0.15	
1112 ^d 3				
1128 ^d 3				
1145 3	5/2 ⁺		0.32	Observed in other odd-mass Re isotopes also.
1229 ^c 3	11/2 ⁻		1.17	J ^π : by analogy with the second J=11/2 ¹⁸⁷ Re and ¹⁸⁹ Re, where state with a larger transition strength (charge exchange) was observed.
1243 ^d 3				
1367 6	(11/2 ⁻)		0.61	J ^π : Proposed in 1977Hi06 from possible values of (7/2 ⁻ ,9/2 ⁺ ,11/2 ⁻).
1408 ^d 6	(3/2 ⁺ ,5/2 ⁻)			

Continued on next page (footnotes at end of table)

$^{192}\text{Os}(t,\alpha),(\text{pol } t,\alpha)$ [1976Hi08,1977Hi06](#) (continued) ^{191}Re Levels (continued)

$E(\text{level})^\dagger$	$J^\pi \ddagger e$	$S^\#$	Comments
1468 6	(3/2 ⁺ , 5/2 ⁻)		
1524 ^d 6			
1560 ^d 6			
1663 ^d 6			
1715 ^d 6			
1835 ^d 6			
1904 ^d 6			
1937 6	5/2 ⁺	0.23	Possible vibrational state.

[†] From [1976Hi08](#).

[‡] From [1977Hi06](#), based on comparison between experimental and theoretical angular distributions of (t,α) cross sections, and from analyzing powers measured in the (pol t,α) reaction. Nilsson orbitals were assigned on the basis of systematics of the same orbitals in other odd-mass Re isotopes. J^π : [1977Hi06](#) note the agreement between experimental and theoretical angular distributions of unpolarized cross sections is good for low (L=0,2) L-values, but is rather poor for high (L=4,5) L-values. Except for L=0,2, only an indication whether a transition has $L \geq 3$ or $L \leq 3$ was obtained from this reaction. Analyzing powers were measured in the polarized reaction. Spin and parity assignments are based on the fact that these quantities are positive for $J=L+1/2$ and negative for $J=L-1/2$, together with L-value information and spectroscopic factors ("FINGERPRINT") from the unpolarized reaction.

[#] Nuclear structure factor. Listed values are from Table 3 in [1977Hi06](#). Deduced from the ratio $(d\sigma/d\Omega)(\theta)(\text{exp})/2N\sigma_{\text{ji}}(\theta)$ ([1976Hi08](#)), which is independent of angle and Q value.

[@] 1/2[411].

[&] 5/2[402].

^a 9/2[514].

^b 7/2[404].

^c 7/2[523].

^d Reported at $\theta=40^\circ$ by [1976Hi08](#) only.

^e See comment following the table heading.