^{176}Hf(d,p), ^{178}Hf(d,t)   1966Ri10,1968Ri07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 159, 1 (2019)	30-Aug-2019

1966Ri10,1968Ri07: ^{176}Hf, 81% enriched target in (d,p) studies, and ^{178}Hf, 96% enriched target in (d,t) studies. E=12 MeV. Measured: scattered protons and tritons at θ=30°, 40°, 50°, 60°, 70°, 80°, and 100°. Magnetic spectrograph.

^{177}Hf Levels

E(level)[†]	J$^{\pi}$[†]	L[‡]	Comments
0.0[#m]	7/2$^-$	(3)	
111[#m]	9/2$^-$	5	
251[#l]	11/2$^-$		
324[@l]	9/2$^+$		
375[l]			
390[k]			
432[@m]	11/2$^+$		
459[l]			
504[&l]	5/2$^-$		
556?[@k]	13/2$^+$		
560[al]	1/2$^-$	1	
567?[bl]	1/2$^-$		
607[bm]	3/2$^-$		
610[&m]	7/2$^-$	3	
624[al]	3/2$^-$		
652[al]	5/2$^-$		
665[bm]	5/2$^-$	3	
703[bm]	7/2$^-$	3	
739[k]	(1/2$^-$,3/2$^-$)	(1)	J$^{\pi}$: From L(d,p)=(1) (by the evaluator).
780[am]	7/2$^-$	3	
804[dm]	3/2$^-$	1	
839[bk]	9/2$^-$		
851[cl]	9/2$^+$		
878[dm]	5/2$^-$	3	
919[k]	(1/2$^-$,3/2$^-$)	(1)	J$^{\pi}$: From L(d,p)=(1) (by the evaluator).
979[dk]	7/2$^-$	3	
1016[k]	5/2$^-$,7/2$^-$	3	
1058[em]	7/2$^-$	3	
1101[l]			
1294[m]	1/2$^-$,3/2$^-$	1	J$^{\pi}$: From L(d,p)=1 (by the evaluator).
1350[m]			
1434[fk]	3/2$^-$	1	
1475[fk]	5/2$^-$		
1502[gk]	3/2$^-$	(1)	
1535[fk]	7/2$^-$	3	
1565[gk]	5/2$^-$	(3)	
1634[hk]	1/2$^-$	1	
1666[jk]	3/2$^-$	(1)	
1701[hk]	3/2$^-$	1	
1743[jk]	5/2$^-$		
1779[hk]	5/2$^-$	3	

Continued on next page (footnotes at end of table)

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^{176}Hf(d,p), ^{178}Hf(d,t)   **1966Ri10,1968Ri07 (continued)**

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^{177}Hf Levels (continued)

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E(level)[†]	J^{π} [†]	L[‡]	Comments
1847^{jk}	$7/2^-$		
1882^{ik}	$1/2^-$	1	
1932^{ik}	$3/2^-$	1	
1932?^{hk}	$7/2^-$		
1969^{ik}	$5/2^-$	3	
2007^{k}	$5/2^-,7/2^-$	3	J^{π}: From L(d,p)=3 (by the evaluator).
2071^{ik}	$7/2^-$	3	
2114^{k}	$5/2^-,7/2^-$	3	J^{π}: From L(d,p)=3 (by the evaluator).

[†] From 1968Ri07, unless otherwise stated.
[‡] From ^{176}Hf(d,p), using a comparison of the experimental cross sections with values calculated using the DWBA approximation (1968Ri07).
[#] $K^{\pi}=7/2^-$, $\nu7/2[514]$.
[@] $K^{\pi}=9/2^+$, $\nu9/2[624]$.
[&] $K^{\pi}=5/2^-$, $\nu5/2[512]$.
[a] $K^{\pi}=1/2^-$, $\nu1/2[521]$.
[b] $K^{\pi}=1/2^-$, $\nu1/2[510]$.
[c] $K^{\pi}=7/2^+$, $\nu7/2[633]$.
[d] $K^{\pi}=3/2^-$, $\nu3/2[512]$.
[e] $K^{\pi}=7/2^-$, $\nu7/2[503]$.
[f] $K^{\pi}=3/2^-$, $\nu3/2[501]$.
[g] $K=3/2$.
[h] $K=1/2$.
[i] $K=1/2$.
[j] $K=3/2$.
[k] Populated in (d,p) only.
[l] Populated in (d,t) only.
[m] Populated in both (d,p) and (d,t).