

Energy levels and branching ratios [94Se07, 81Se18].

¹³⁴Ce
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E^*	J^π	$T_{1/2}$ or	Ref.	Branching ratios in percentage						
[keV]		Γ_{cm}		E^*_f : J^π_f :	0.0 0 ⁺	409.12 2 ⁺	965.42 2 ⁺	1048.65 4 ⁺	1382.60 ⟨3 ⁺ ⟩	1572.2
0.0	0 ⁺	3.16(4) d								
409.12(10)	2 ⁺	23(2) ps	04La03		100					
965.42(12)	2 ⁺				50(6)	50(6)				
1048.65(12)	4 ⁺	3.3(6) ps	04La03			100				
1382.60(14)	⟨3 ⁺ ⟩					79(10)	21(4)			
1533*	0 ⁺									
1572.2(4)									100	
1643.11(13)	4 ⁺					14(3)	65(10)	21(4)	<25	
1774.9(3)						74(22)	26(14)			
1811.80(14)	4 ⁺						28(4)	43(6)	24(3)	
1862.9(3)	6 ⁺	2.8(9) ps						100		
1903.7(4)	1,2,3					100				
1964*	2 ⁺									
1989.0(4)	1,2,3					100				
2027.13(14)	⟨5 ⁺ ⟩						2.2(9)	25(3)	8(1)	
2050.00(19)	⟨5 ⁺ ⟩								100	
2158.3(3)										
2170*										
2174.30(18)	⟨5 [−] ⟩							100		
2206*										
2246.8(4)								100		
2261*										
2272*										
2303.58(18)	6 ⁺									
2313.5(3)	1,2,3					100				
2359.05(18)	⟨6 [−] ⟩									7(2)
2361.26(24)	⟨6 ⁺ ⟩							17(7)		
2373.2(10)						100				
2473.71(18)	⟨6 [−] ⟩									
2545.0(3)	⟨3 ⁺ ⟩					63(8)			4.0(16)	
2565.77(22)	⟨7 [−] ⟩									
2654.8(6)										
2706.64(18)	⟨7 [−] ⟩									
2767.9(4)	7 ⁺									
2773*										
2810.95(22)	8 ⁺	<0.7 ps								
2820.7(4)										
2840*										
2896.29(19)	⟨8 [−] ⟩									
2948										
2969.3(3)										
3017.40(22)	8 ⁺									
3032*										
3068*										
3072.8(4)										

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E^* [keV]	J^π	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage					
				E_f^* : J_f^π :	0.0 0 ⁺	409.12 2 ⁺	965.42 2 ⁺	1048.65 4 ⁺	1382.60 <3 ⁺ > 1572.2
3143.2(3)									
3158.14(23)	<9 ⁻ >								
3199*									
3208.5(3)	10 ⁺	308(5) ns							
3261*									
3289*									
3300*									
3306*									
3317*									
3381.1(6)									
3405*									
3466*									
3592*									
3634.0(4)	<10 ⁻ >								
3655.3(9)									
3663*									
3719.26(25)	10 ⁺	5.8(10) ps							
3817.5(4)	<10 ⁺ >								
3851.5(9)									
3865*									
3895*									
3945.1(5)									
3973.3(5)	<11 ⁺ >								
4006.4(4)	12 ⁺								
4009.1(9)									
4108*									
4173.1(14)									
4183.6(5)	12 ⁺	11.0(13) ps							
4346.1(9)									
4539.9(6)									
4762.2(4)	14 ⁺								
4908.2(7)	14 ⁺	1.2(4) ps							
5492.2(5)									
5495.7(8)									
5725.9(7)	16 ⁺	1.5(5) ps	04La03						
5865.2(11)									
6598.1(9)	<18 ⁺ >		04La03						
7583	20 ⁺		04La03						
8585	22 ⁺		04La03						

Additional data on this isotope can be found in [04La03, 00Ga24].

* Levels from [00Ga24] absent in Nuclear Data Sheets [94Se07].

5 bands with energy levels up to 6-8 MeV were studied in [04La03].

Data for this isotope are considered in vol. LB I/18B.

Energy levels and branching ratios [94Se07, 81Se18]. Part 2

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E^* [keV]	J^π	Branching ratios in percentage								
		E_f^* : J_f^π :	1643.11 4 ⁺	1811.80 <4>	1862.9 6 ⁺	2027.13 <5 ⁺ >	2050.00 <5 ⁺ >	2158.3	2174.30 <5 ⁻ >	2303.58 6 ⁺
1811.80(14)	4 ⁺		4.9(10)							
2027.13(14)	<5 ⁺ >		22(3)	43(5)						
2158.3(3)				100						
2303.58(18)	6 ⁺		86(22)				14(3)			
2359.05(18)	<6 ⁻ >					52(7)	27(4)		14(2)	
2361.26(24)	<6 ⁺ >		11(5)			72(10)				
2473.71(18)	<6 ⁻ >					31(6)		4(1)	43(5)	14(1)
2545.0(3)	<3 ⁺ >					25(8)				
2565.77(22)	<7 ⁻ >								100	<75
2706.64(18)	<7 ⁻ >								58(6)	<28
2767.9(4)	7 ⁺									100
2810.95(22)	8 ⁺				94(9)					
2820.7(4)										100
3017.40(22)	8 ⁺									67(17)

Energy levels and branching ratios [94Se07, 81Se18]. Part 3

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E^* [keV]	J^π	Branching ratios in percentage										
		E_f^* : J_f^π :	2313.5 1,2,3	2359.05 <6 ⁻ >	2361.26 <6 ⁺ >	2473.71 <6 ⁻ >	2565.77 <7 ⁻ >	2706.64 <7 ⁻ >	2767.9	2810.95 8 ⁺	2896.29 <8 ⁻ >	2969.3
2473.71(18)	<6 ⁻ >			8(3)								
2545.0(3)	<3 ⁺ >		7.9(16)									
2565.77(22)	<7 ⁻ >			<82								
2654.8(6)					100							
2706.64(18)	<7 ⁻ >			≈9		3.7(9)	30(15)					
2810.95(22)	8 ⁺				4.7(16)	1.8(7)						
2896.29(19)	<8 ⁻ >			31(7)		43(6)	<14	26(4)				
2969.3(3)				[100]								
3017.40(22)	8 ⁺							14(6)		<71	19(10)	
3072.8(4)											[100]	
3143.2(3)									60(24)	<32	9(3)	31(11)
3158.14(23)	<9 ⁻ >						83(8)			≈17	<43	
3208.5(3)	10 ⁺									81(10)		
3634.0(4)	<10 ⁻ >										100	
3719.26(25)	10 ⁺									90(8)		
3817.5(4)	<10 ⁺ >									100		

Energy levels and branching ratios [94Se07, 81Se18]. Part 4

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E^*	J^π	Branching ratios in percentage										
[keV]		E_f^* : J_f^π :	3017.40 8 ⁺	3072.8	3143.2	3158.14 9 ⁻	3208.5 10 ⁺	3381.1	3655.3	3719.26 10 ⁺	3851.5	3945.1
3208.5(3)	10 ⁺		19(5)									
3381.1(6)					100							
3655.3(9)								100				
3719.26(25)	10 ⁺		2.6(16)		≈7							
3851.5(9)									100			
3945.1(5)					[100]							
3973.3(5)	11 ⁺					100						
4006.4(4)	12 ⁺					100						
4009.1(9)											100	
4183.6(5)	12 ⁺									100		
4539.9(6)												100

Energy levels and branching ratios [94Se07, 81Se18]. Part 5

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E^* [keV]	J^π	Branching ratios in percentage									
		E_f^* : J_f^π :	4006.4 12 ⁺	4009.1	4183.6 12 ⁺	4346.1	4539.9	4762.2 14 ⁺	4908.2 14 ⁺	5725.9 16 ⁺	
4173.1(14)				100							
4346.1(9)				100							
4762.2(4)	14 ⁺		75(19)			≈25					
4908.2(7)	14 ⁺				100						
5492.2(5)								100			
5495.7(8)							100				
5725.9(7)	16 ⁺								100		
5865.2(11)								100			
6598.1(9)	18 ⁺										100

Energy levels and branching ratios [98Se07].

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E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}	Branching ratios in percentage							
			E_f^* : $2J_f^\pi$:	0.0 1 ⁽⁺⁾	82.67 3 ⁽⁺⁾	296.11 5 ⁺	296.12	445.8 11 ⁻	620.95	806.9
0.0	1 ⁽⁺⁾	17.7(3) h								
82.67(5)	3 ⁽⁺⁾	0.53(6) ns		100						
296.11(5)	5 ⁺			20(2)	80(3)					
296.12(5)	1 ⁽⁺⁾ , 3 ⁽⁺⁾			100	x					
445.8(2)	11 ⁻	20(1) s				100				
620.95(11)	3 ⁽⁺⁾ , 5 ⁽⁺⁾			15(2)	78(9)	≈3.7	≈3.7			
696.7(2)	1 ⁺ -5 ⁺			<77	100	<22	<22			

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E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}	Branching ratios in percentage						
			$E_f^*:$ $2J_f^\pi:$	0.0 1 ⁽⁺⁾	82.67 3 ⁽⁺⁾	296.11 5 ⁽⁺⁾	296.12 11 ⁽⁻⁾	445.8 11 ⁽⁻⁾	620.95 806.9
780.4(2)	1 ⁺ -5 ⁺	8.2(4) ns		20(5)	<70	≈53	≈27		
806.9(2)	1,3,5 ⁺			75(13)	25(13)				
1016.84(15)	1 ⁺ -5 ⁺			35(5)	41(7)		24(10)		
1035.8(4)	13 ⁻							100	
1145.3(4)	15 ⁻							98(11)	
1367.4(5)	1,3,5 ⁺			44(8)	28(8)				28(18)
1670.1(5)	15 ⁻								
1728.7(5)	1-5				33(7)	51(9)			16(7)
1834.9(3)	1-5				32(5)	≈34	≈34		
1869.5(5)	17 ⁻								
1950.6(9)	1-5 ⁺			47(14)	43(19)				10(7)
2020.6(6)	1-5 ⁺			30(9)	26(9)				43(13)
2051.7(5)	19 ⁻								
2125.4(6)	19 ⁺								
2249.0(6)	19 ⁻								
2551.0(6)	23 ⁺								
2682.3(6)	21 ⁻								
2887.6(7)	21 ⁻								
2946.2(6)	19 ⁺								
2948.0(7)	23 ⁻								
3054.1(6)	21 ⁺								
3076.3(6)	21 ⁺								
3104.1(6)	23 ⁻								
3229.1(6)	23 ⁺								
3431.2(8)	25 ⁺								
3505.5(7)	25 ⁻								
3514.6(7)	27 ⁺								
3699.1(9)	27 ⁺								
3701.8(7)	27 ⁻								
3771.6(6)	27 ⁺								
4032.5(7)	25 ⁻								
4065.7(7)	25 ⁻								
4127.5(9)	29 ⁺								
4183.2(7)	27 ⁻								
4259.5(8)	31 ⁺								
4400.1(8)	31 ⁻								
4460.6(7)	29 ⁻								
4485.8(9)	31 ⁺								
4495.9(7)	27 ⁻								
4634.9(6)	29 ⁻								
4813.2(7)	31 ⁻								
4830.6(8)	31 ⁻								
4978.7(10)	33 ⁺								
5062.2(7)	33 ⁻								
5206.3(8)	33 ⁻								

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E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}	Branching ratios in percentage							
			E_f^* : $2J_f^\pi$:	0.0 1 ⁽⁺⁾	82.67 3 ⁽⁺⁾	296.11 5 ⁽⁺⁾	296.12	445.8 11 ⁽⁻⁾	620.95	806.9
5324.4(9)	35 ⁺									
5342.2(13)	35 ⁻									
5359.7(8)	35 ⁻									
5427.9(10)	35 ⁺									
5651.4(9)	35 ⁻									
5751.9(10)	37 ⁻									
5941.8(12)	37 ⁺									
6086.3(10)	37 ⁻									
6256.5(10)	39 ⁻									
6299.4(13)	39 ⁺									
6443.8(13)	39 ⁺									
6477.2(17)	39 ⁻									
6526.3(10)	39 ⁻									
6840.1(11)	41 ⁻									
6994.3(11)	41 ⁻									
7470.1(15)	43 ⁻									
7494.3(12)	43 ⁻									
8011.3(16)	45 ⁻									
8034.1(18)	45 ⁻									

Additional data on this isotope can be found in [90Ma26, 82Ze01, 74Gi01].

Comparison of levels in N=77 isotones can be found in [70Dr04].

Energy levels and branching ratios [98Se07]. Part 2

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E^*	$2J^\pi$	Branching ratios in percentage										
[keV]		E_f^* : $2J_f^\pi$:	1035.8 $\langle 13^- \rangle$	1145.3 $\langle 15^- \rangle$	1670.1 $\langle 15^- \rangle$	1869.5 $\langle 17^- \rangle$	2051.7 $\langle 19^- \rangle$	2125.4 $\langle 19^+ \rangle$	2249.0 $\langle 19^- \rangle$	2551.0 $\langle 23^+ \rangle$	2682.3 $\langle 21^- \rangle$	2887.6 $\langle 21^- \rangle$
1145.3(4)	$\langle 15^- \rangle$		1.6(4)									
1670.1(5)	$\langle 15^- \rangle$		100	<8								
1869.5(5)	$\langle 17^- \rangle$		65(7)	35(4)								
2051.7(5)	$\langle 19^- \rangle$			96(9)		3.7(10)						
2125.4(6)	$\langle 19^+ \rangle$					100						
2249.0(6)	$\langle 19^- \rangle$				72(9)	28(4)						
2551.0(6)	$\langle 23^+ \rangle$							100				
2682.3(6)	$\langle 21^- \rangle$								100			
2887.6(7)	$\langle 21^- \rangle$					50(10)	50(10)					
2946.2(6)	$\langle 19^+ \rangle$					100						
2948.0(7)	$\langle 23^- \rangle$						47(7)				53(7)	
3054.1(6)	$\langle 21^+ \rangle$							50(12)		50(12)		
3076.3(6)	$\langle 21^+ \rangle$							<67		100		
3104.1(6)	$\langle 23^- \rangle$						100					<6
3229.1(6)	$\langle 23^+ \rangle$									28(9)		

(continued)

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E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		E_f^* : $2J_f^\pi$:	1035.8 ⟨13 ⁻ ⟩	1145.3 ⟨15 ⁻ ⟩	1670.1 ⟨15 ⁻ ⟩	1869.5 ⟨17 ⁻ ⟩	2051.7 ⟨19 ⁻ ⟩	2125.4 ⟨19 ⁺ ⟩	2249.0 ⟨19 ⁻ ⟩	2551.0 ⟨23 ⁺ ⟩	2682.3 ⟨21 ⁻ ⟩	2887.6 ⟨21 ⁻ ⟩
3505.5(7)	⟨25 ⁻ ⟩										50(16)	
3514.6(7)	⟨27 ⁺ ⟩									100		
3771.6(6)	⟨27 ⁺ ⟩									100		
4065.7(7)	⟨25 ⁻ ⟩											50(25)

Energy levels and branching ratios [98Se07]. Part 3

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E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		E_f^* : $2J_f^\pi$:	2946.2 ⟨19 ⁺ ⟩	2948.0 ⟨23 ⁻ ⟩	3054.1 ⟨21 ⁺ ⟩	3076.3 ⟨21 ⁺ ⟩	3104.1 ⟨23 ⁻ ⟩	3229.1 ⟨23 ⁺ ⟩	3431.2 ⟨25 ⁺ ⟩	3505.5 ⟨25 ⁻ ⟩	3514.6 ⟨27 ⁺ ⟩	3699.1 ⟨27 ⁺ ⟩
3054.1(6)	⟨21 ⁺ ⟩		<12									
3076.3(6)	⟨21 ⁺ ⟩		<43									
3229.1(6)	⟨23 ⁺ ⟩				72(9)	<14						
3431.2(8)	⟨25 ⁺ ⟩							100				
3505.5(7)	⟨25 ⁻ ⟩			50(16)								
3699.1(9)	⟨27 ⁺ ⟩								100			
3701.8(7)	⟨27 ⁻ ⟩			100								
3771.6(6)	⟨27 ⁺ ⟩										<40	
4032.5(7)	⟨25 ⁻ ⟩					100						
4065.7(7)	⟨25 ⁻ ⟩					50(25)						
4127.5(9)	⟨29 ⁺ ⟩								<18			100
4183.2(7)	⟨27 ⁻ ⟩					28(7)						
4259.5(8)	⟨31 ⁺ ⟩										100	
4485.8(9)	⟨31 ⁺ ⟩											17(8)
4495.9(7)	⟨27 ⁻ ⟩									100		
4634.9(6)	⟨29 ⁻ ⟩									38(12)		

Energy levels and branching ratios [98Se07]. Part 4

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E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		E_f^* : $2J_f^\pi$:	3701.8 ⟨27 ⁻ ⟩	3771.6 ⟨27 ⁺ ⟩	4032.5 ⟨25 ⁻ ⟩	4065.7 ⟨25 ⁻ ⟩	4127.5 ⟨29 ⁺ ⟩	4183.2 ⟨27 ⁻ ⟩	4259.5 ⟨31 ⁺ ⟩	4400.1 ⟨31 ⁻ ⟩	4460.6 ⟨29 ⁻ ⟩	4485.8 ⟨31 ⁺ ⟩
4183.2(7)	⟨27 ⁻ ⟩				50(7)	22(7)						
4400.1(8)	⟨31 ⁻ ⟩		100									
4460.6(7)	⟨29 ⁻ ⟩							100				
4485.8(9)	⟨31 ⁺ ⟩						83(8)					
4634.9(6)	⟨29 ⁻ ⟩		<25	62(12)								
4813.2(7)	⟨31 ⁻ ⟩										18(9)	
4830.6(8)	⟨31 ⁻ ⟩										100	

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E^*	$2J^\pi$	Branching ratios in percentage										
[keV]		$E_f^*:$ $2J_f^\pi:$	3701.8 $\langle 27^- \rangle$	3771.6 $\langle 27^+ \rangle$	4032.5 $\langle 25^- \rangle$	4065.7 $\langle 25^- \rangle$	4127.5 $\langle 29^+ \rangle$	4183.2 $\langle 27^- \rangle$	4259.5 $\langle 31^+ \rangle$	4400.1 $\langle 31^- \rangle$	4460.6 $\langle 29^- \rangle$	4485.8 $\langle 31^+ \rangle$
4978.7(10)	$\langle 33^+ \rangle$						<29					100
5062.2(7)	$\langle 33^- \rangle$								<22			
5206.3(8)	$\langle 33^- \rangle$										<50	
5324.4(9)	$\langle 35^+ \rangle$								100			
5342.2(13)	$\langle 35^- \rangle$									100		
5427.9(10)	$\langle 35^+ \rangle$											<40

Energy levels and branching ratios [98Se07]. Part 5

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E^*	$2J^\pi$	Branching ratios in percentage										
[keV]		E_f^* : $2J_f^\pi$:	4495.9 $\langle 27^- \rangle$	4634.9 $\langle 29^- \rangle$	4813.2 $\langle 31^- \rangle$	4830.6 $\langle 31^- \rangle$	4978.7 $\langle 33^+ \rangle$	5062.2 $\langle 33^- \rangle$	5206.3 $\langle 33^- \rangle$	5324.4 $\langle 35^+ \rangle$	5342.2 $\langle 35^- \rangle$	5359.7 $\langle 35^- \rangle$
4634.9(6)	$\langle 29^- \rangle$		<18									
4813.2(7)	$\langle 31^- \rangle$			82(9)								
5062.2(7)	$\langle 33^- \rangle$				100							
5206.3(8)	$\langle 33^- \rangle$					100						
5359.7(8)	$\langle 35^- \rangle$							100				
5427.9(10)	$\langle 35^+ \rangle$						100					
5651.4(9)	$\langle 35^- \rangle$					<15			100			
5751.9(10)	$\langle 37^- \rangle$											100
6086.3(10)	$\langle 37^- \rangle$								<18			
6299.4(13)	$\langle 39^+ \rangle$									100		
6477.2(17)	$\langle 39^- \rangle$										100	

Energy levels and branching ratios [98Se07]. Part 6

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E^*	$2J^\pi$	Branching ratios in percentage									
[keV]	$E_f^*:$ $2J_f^\pi:$	5427.9 $\langle 35^+ \rangle$	5651.4 $\langle 35^- \rangle$	5751.9 $\langle 37^- \rangle$	5941.8 $\langle 37^+ \rangle$	6086.3 $\langle 37^- \rangle$	6256.5 $\langle 39^- \rangle$	6526.3 $\langle 39^- \rangle$	6840.1 $\langle 41^- \rangle$	6994.3 $\langle 41^- \rangle$	7470.1 $\langle 43^- \rangle$
6086.3(10)	$\langle 37^- \rangle$		100								
6256.5(10)	$\langle 39^- \rangle$			100							
6526.3(10)	$\langle 39^- \rangle$		<33			100					
6840.1(11)	$\langle 41^- \rangle$						100				
6994.3(11)	$\langle 41^- \rangle$					<67		100			
7470.1(15)	$\langle 43^- \rangle$								100		
8034.1(18)	$\langle 45^- \rangle$										100

Energy levels and branching ratios [98Se07]. Part 7

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E^*	$2J^\pi$	Branching ratios in percentage	
[keV]		E_f^* :	7494.3
		$2J_f^\pi$:	$\langle 43^- \rangle$
8011.3(16)	$\langle 45^- \rangle$		100

Energy levels and branching ratios [02So05].

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E^*	J^π	$T_{1/2}$ or	Branching ratios in percentage							
[keV]		Γ_{cm}	E_f^* :	0.0	0+X	552	189+X	347+X	548+X	1076
			J_f^π :	0 ⁺	J_1	2 ⁺	J_1+1	J_1+2	J_1+3	$\langle 0^+ \rangle$
0.0	0 ⁺	>0.7·10 ¹⁴ yr								
0+X*	J_1									
552.20(11) ^d	2 ⁺	6.8(7) ps		100						
189+X*	J_1+1				x					
347.0+X*	J_1+2						x			
548+X*	J_1+3							x		
1076.3(4)	$\langle 0^+ \rangle$					100				
1092.09(11)	2 ⁺			26(1)		74				
717+X	J_1+4								x	
1314.15(22) ^d	4 ⁺	6.6(18) ps				100				
1553.00(18)	$\langle 3 \rangle^+$					39.7(21)				
1101+X*	J_1+5									
1335+X*	J_1+6									
1978.5(3) ^a	$\langle 5 \rangle^-$	≤3 ns								
2067.19(15)	$\langle 1 \rangle$			55(3)		36(4)				3.1(5)
1628+X*	J_1+7									
1979 ^a	5 ⁻									
2154.95(15)	2 ⁽⁺⁾			7.5(9)		86(7)				
2214.0(3) ^d	6 ⁺	≤5 ns								
2307.1(4) ^a	$\langle 7 \rangle^-$	≤3 ns								
2366.5(3) ^e	6 ⁺	≤5 ns								
2424.9(4) ^b	$\langle 6 \rangle^-$	≤3 ns								
2451.45(14)	2 ⁽⁺⁾			29(3)		30(9)				
2517.32(17)	$\langle 3 \rangle$					12.0(12)				
2594.80(22)	$\langle 2^+ \rangle$			11(1)		51(4)				
2683.8(4)	$\langle 2^+ \rangle$			25(3)		40(4)				
2794.77(21)	$\langle 1 \rangle$			14(1)		86(7)				
2826.1(7)	$\langle 2^- \rangle$					33(7)				
2866.01(20)	1,2,3			10(5)		59(5)				8.8(10)
2905.5(5)	$\langle 2^- \rangle$					100				
2932.3(3)	$\langle 1 \rangle$			22(3)		78(9)				
2942.3(5)	2 ⁽⁺⁾			19(4)		37(4)				
2955.0(11) ^d	8 ⁺									
2989.8(3)	8 ⁺									
2991.4(5)	$\langle 3,4^+ \rangle$					46(4)				

(continued)

¹³⁶Ce
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E^* [keV]	J^π	$T_{1/2}$ or Γ_{cm}	Branching ratios in percentage							
			$E_f^*:$ $J_f^\pi:$	0.0 0^+	0+X J_1	552 2^+	189+X J_1+1	347+X J_1+2	548+X J_1+3	1076 $\langle 0^+ \rangle$
3011.22(21)						34(4)				
3095.5(4) ^e	10^+	$2.2(2) \mu\text{s}$								
3146.7(4) ^b	$\langle 8^- \rangle$	$\leq 3 \text{ ns}$								
3174.7(3)	$\langle 1 \rangle$			17(3)		35(3)				
3201.5(4)	$2^{\langle + \rangle}$			19(3)		14(3)				
3233.2(6)	$\langle 0^-, 2^- \rangle$					69(9)				
3265.16(25)	$\langle 1 \rangle$			49(5)		29(6)				
3278.1(4) ^a	$\langle 9^- \rangle$	$\leq 3 \text{ ns}$								
3282.6(3)	$\langle 1 \rangle$			13(2)		27(3)				17(2)
3362.4(3)	$\langle 1 \rangle$			10(2)		31(4)				
3400.0(15) ^d	$[10^+]$	$\leq 3 \text{ ns}$								
3441 ^g	$[9^+]$									
3579.7(7)	$\langle 1 \rangle$			100		<67				
3705.4(3)	$\langle 2^- \rangle$					33(3)				
3760.7(4) ^e	12^+									
3830.7(8)										
3846.8(11)										
3866.0(15) ^g	$[10^+]$									
3987.0(4) ^b	$\langle 10^- \rangle$	$\leq 3 \text{ ns}$								
4023.36(25)	$\langle 2^- \rangle$					19(2)				
4084.3(5) ^a	$\langle 11^- \rangle$	$\leq 3 \text{ ns}$								
4240.7(4) ^b	$\langle 11^- \rangle$									
4291.0(18) ^f	$[12^+]$									
4361 ^g	$11^{\langle + \rangle}$									
4597 ^b	12^-									
4786.0(21) ^f	$[14^+]$									
4833.3(4) ^e	14^+									
4872.8(5) ^b	$\langle 13^- \rangle$									
5098.0(15) ^a	$\langle 13^- \rangle$									
5305.3(5) ^e	$\langle 15^+ \rangle$									
5354.0(23)	$J+6$									
5569 ^g	$15^{\langle + \rangle}$									
5594.3(5) ^e	16^+									
5643 ^f	16^+									
5645.0(11) ^c	$\langle 14^- \rangle$									
5800.9(5) ^b	$\langle 15^- \rangle$									
5809.0(5) ^c	15^-									
5841.3(6)	$\langle 16^+ \rangle$									
5856.0(6)										
5877 ^f	17^+									
5994.0(25)	$J+8$									
5994.9(5) ^c	$\langle 16^- \rangle$									
6099.1(6) ^e	$\langle 17^+ \rangle$									
6170 ^f	18^+									
6274 ^g	$[17^+]$									

(continued)

¹³⁶Ce
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E^* [keV]	J^π	$T_{1/2}$ or Γ_{cm}	Branching ratios in percentage							
			E_f^* : J_f^π :	0.0 0 ⁺	0+X J_1	552 2 ⁺	189+X J_1+1	347+X J_1+2	548+X J_1+3	1076 (0 ⁺)
6283.0(6) ^c	⟨17 ⁻ ⟩									
6539 ^f	19 ⁺									
6642.8(7) ^e	⟨18 ⁺ ⟩									
6662.9(7) ^c	⟨18 ⁻ ⟩									
6700(3)	$J+10$									
6832 ^b	17 ⁻									
6933 ^f	20 ⁺									
7087 ^g	[19 ⁺]									
7099.4(7) ^c	⟨19 ⁻ ⟩									
7239 ^e	⟨19 ⁺ ⟩									
7345 ^f	21 ⁺									
7585.9(8) ^c	⟨20 ⁻ ⟩									
7801 ^f	22 ⁺									
8100.8(13) ^c	⟨21 ⁻ ⟩									
8316 ^f	[23 ⁺]									
8625.8(16) ^c	⟨22 ⁻ ⟩									
9228 ^c	23 ⁻									

Additional data on this isotope can be found in [02La26, 90Pa05].

Abundance: 0.185(2) %.

* Asterisk marks band assigned in [02So05]; J=10 was accepted there for the level at 4786 keV.

Letters a-g correspond to bands B1-B7 in [05La29], all assignments are considered as tentative.

Data for this isotope are considered in vol. LB I/18B.

Energy levels and branching ratios [02So05]. Part 2

¹³⁶Ce
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E^*	J^π	Branching ratios in percentage									
[keV]	E_f^* : J_f^π :	1092 2 ⁺	717+X J_1 +4	1314.15 4 ⁺	1553.00 $\langle 3 \rangle^+$	1101+X J_1 +5	1335+X J_1 +6	1978.5 $\langle 5 \rangle^-$	2154.95 2 ⁽⁺⁾	2214.0 6 ⁺	2307.1 $\langle 7 \rangle^-$
1553.00(18)	$\langle 3 \rangle^+$	60(3)									
1101+X*	J_1 +5		x								
1335+X*	J_1 +6					x					
1978.5(3) ^a	$\langle 5 \rangle^-$			100							
2067.19(15)	$\langle 1 \rangle$	6.3(9)									
1628+X*	J_1 +7						x				
2154.95(15)	2 ⁽⁺⁾	4.6(5)		1.6(3)							
2214.0(3) ^d	6 ⁺			100							
2307.1(4) ^a	$\langle 7 \rangle^-$							100			
2366.5(3) ^e	6 ⁺			100							
2424.9(4) ^b	$\langle 6 \rangle^-$							100			
2451.45(14)	2 ⁽⁺⁾	41(4)									
2517.32(17)	$\langle 3 \rangle$	72(8)		16.0(20)							
2594.80(22)	$\langle 2^+ \rangle$	17(2)		9.2(11)	11.0(11)						

(continued)

 $^{136}_{58}\text{Ce}$

E^*	J^π	Branching ratios in percentage										
[keV]		E^*_f : J^π_f	1092 2 ⁺	717+X J_1+4	1314.15 4 ⁺	1553.00 $\langle 3 \rangle^+$	1101+X J_1+5	1335+X J_1+6	1978.5 $\langle 5 \rangle^-$	2154.95 2 ^{$\langle + \rangle$}	2214.0 6 ⁺	2307.1 $\langle 7 \rangle^-$
2683.8(4)	$\langle 2^+ \rangle$		<30		34(4)							
2826.1(7)	$\langle 2^- \rangle$		34(4)							33(4)		
2866.01(20)	1,2,3		22(3)									
2905.5(5)	$\langle 2^- \rangle$		<35									
2942.3(5)	2 ^{$\langle + \rangle$}				44(6)							
2955.0(11) ^d	8 ⁺										100	
2989.8(3)	8 ⁺										37(3)	
2991.4(5)	$\langle 3,4^+ \rangle$				54(6)							
3011.22(21)			29(4)							37(4)		
3146.7(4) ^b	$\langle 8^- \rangle$											10(4)
3174.7(3)	$\langle 1 \rangle$		49(6)									
3201.5(4)	2 ^{$\langle + \rangle$}		34(4)		33(4)							
3233.2(6)	$\langle 0^-, 2^- \rangle$		31(3)									
3265.16(25)	$\langle 1 \rangle$		23(2)									
3278.1(4) ^a	$\langle 9 \rangle^-$											100
3282.6(3)	$\langle 1 \rangle$		43(3)									
3362.4(3)	$\langle 1 \rangle$		60(7)									
3705.4(3)	$\langle 2^- \rangle$		67(7)									
4023.36(25)	$\langle 2^- \rangle$					25(3)						

Energy levels and branching ratios [02So05]. Part 3

 $^{136}_{58}\text{Ce}$

E^* [keV]	J^π	Branching ratios in percentage									
		E^*_f : J^π_f :	2366.5 6 ⁺	2424.9 $\langle 6 \rangle^-$	2955.0 8 ⁺	2989.8 8 ⁺	2991.4 $\langle 3,4^+ \rangle$	3011.22	3095.5 10 ⁺	3146.7 $\langle 8^- \rangle$	3278.1 $\langle 9 \rangle^-$
2989.8(3)	8 ⁺		63(4)								
3095.5(4) ^e	10 ⁺					100					
3146.7(4) ^b	$\langle 8^- \rangle$			90(13)							
3400.0(15) ^d	[10 ⁺]				100						
3760.7(4) ^e	12 ⁺								100		
3830.7(8)						100					
3846.8(11)						100					
3866.0(15) ^g	[10 ⁺]				100						
3987.0(4) ^b	$\langle 10^- \rangle$									100	
4023.36(25)	$\langle 2^- \rangle$						18(4)	37(4)			
4084.3(5) ^a	$\langle 11 \rangle^-$										100
4240.7(4) ^b	$\langle 11 \rangle^-$										<16.7

Energy levels and branching ratios [02So05]. Part 4

¹³⁶Ce
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E^* [keV]	J^π	Branching ratios in percentage								
		E_f^* : J_f^π :	3760.7 12 ⁺	3830.7	3866.0 J	3987.0 $\langle 10^- \rangle$	4084.3 $\langle 11^- \rangle$	4240.7 $\langle 11^- \rangle$	4291.0 $J+2$	4786.0 $J+4$
4240.7(4) ^b	$\langle 11^- \rangle$			<16.7		100				
4291.0(18) ^f	[12 ⁺]				100					
4786.0(21) ^f	[14 ⁺]								100	
4833.3(4) ^e	14 ⁺		100							
4872.8(5) ^b	$\langle 13^- \rangle$							100		
5098.0(15) ^a	$\langle 13^- \rangle$						100			
5354.0(23)	$J+6$									100

Energy levels and branching ratios [02So05]. Part 5

¹³⁶Ce
58

E^* [keV]	J^π	Branching ratios in percentage								
		E_f^* : J_f^π :	4833.3 14 ⁺	4872.8 $\langle 13^- \rangle$	5098.0 $\langle 13^- \rangle$	5305.3 $\langle 15^+ \rangle$	5354.0 $J+6$	5594.3 16 ⁺	5645.0 $\langle 14^- \rangle$	5800.9 $\langle 15^- \rangle$
5305.3(5) ^e	$\langle 15^+ \rangle$		100							
5594.3(5) ^e	16 ⁺		100			x				
5645.0(11) ^c	$\langle 14^- \rangle$				100					
5800.9(5) ^b	$\langle 15^- \rangle$			100						
5809.0(5) ^c	15 ⁻		<29	100					<29	
5841.3(6)	$\langle 16^+ \rangle$					100				
5856.0(6)						100				
5994.0(25)	$J+8$						100			
5994.9(5) ^c	$\langle 16^- \rangle$					27(4)				18(4)
6099.1(6) ^e	$\langle 17^+ \rangle$							100		

Energy levels and branching ratios [02So05]. Part 6

¹³⁶Ce
58

E^*	J^π	Branching ratios in percentage									
		E^*_f :	5809.0	5994.0	5994.9	6099.1	6283.0	6662.9	7099.4	7585.9	8100.8
[keV]		J^π_f :	15 ⁻	$J+8$	$\langle 16 \rangle^-$	$\langle 17^+ \rangle$	$\langle 17^- \rangle$	$\langle 18^- \rangle$	$\langle 19^- \rangle$	$\langle 20^- \rangle$	$\langle 21^- \rangle$
5994.9(5) ^c	$\langle 16 \rangle^-$		55(4)								
6283.0(6) ^c	$\langle 17^- \rangle$				100						
6642.8(7) ^e	$\langle 18^+ \rangle$					100					
6662.9(7) ^c	$\langle 18^- \rangle$						100				
6700(3)	$J+10$			100							
7099.4(7) ^c	$\langle 19^- \rangle$							100			
7585.9(8) ^c	$\langle 20^- \rangle$								100		
8100.8(13) ^c	$\langle 21^- \rangle$									100	
8625.8(16) ^c	$\langle 22^- \rangle$										100

Energy levels and branching ratios [94Tu02].

¹³⁷Ce
58

E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage							
				E_f^* : $2J_f^\pi$:	0.0 3 ⁺	160.3 (1) ⁺	254 11 ⁻	434 (3) ⁺	514 (3) ⁺	763 (5,3) ⁺	837 (5) ⁺
0.0	3 ⁺	9.0(3) h									
160.32(9)	(1) ⁺	0.79(14) ns			100						
254.29(5) ^a	11 ⁻	34.4(3) h	00Zh27		100						
433.9(2)	(3) ⁺				97(9)	3.3(7)					
514.0(2)	(3) ⁺				65(6)	35(3)					
763.0(2)	(5,3) ⁺				27(1)	44(4)		25(4)	3.2(9)		
825.7(1)	(1,3)				x	x					
836.6(2)	(5) ⁺				96(10)	0.7(4)		3.5(4)			
866.6(1)	(5,3)				85(3)	15(3)					
927.6(5) ^a	15 ⁻		00Zh27				100				
1105.2(2)	3				49(5)	5(2)		18(2)	29(2)		
1144.4	13 ⁻						100				
1147.2								100			
1179.5(2)	(5 ⁺)				16(2)	8(1)		37(2)	23(2)	16(2)	
1258.8(4)					18(7)			82(7)			
1271.5(3)	3				15.7(16)	84(2)					
1288.5(4)					24(8)	76(16)					
1337.4								100			
1435.3(2)					7(1)			38(3)	56(3)		
1476.6(4)	(5 ⁺ , 3 ⁺)				13(2)				4(1)	56(4)	
1570.5(4)					19(5)				62(9)		19(5)
1577.2(2)	(1)										
1602.7(3)	3								100		
1643.0(3)	(1)										
1687.1(20)	(1)										
1693.3(4)					47(7)	11(4)		14(7)			28(7)
1715.2(8)	(1)										
1728.1(4)	(1)										
1800.5(2)					55(4)			4(2)	15(2)		
1887.2(3)	3				33(7)	14(3)		22(3)	6(2)	25(5)	
1909.0(5)	(1)										
1925.2(4)						3.1(11)					97(5)
1933.0(5)	3				5.0(11)	1.7(11)			19(1)	15(2)	51(4)
1951.9(4)	3				8(3)	7(2)		17(3)	68(5)		
1980.5	15 ⁻		00Zh27								
2039.1(7) ^a	19 ⁻		00Zh27								
2040.6(8)	(1)										
2061.1(3)	(1)										
2113.4(4)					29(5)			24(3)		7(2)	28(3)
2134.3(4)	3 ⁽⁺⁾				17(4)	2.2(7)		42(4)	24(4)		
2142.7(5)	(1)										
2152.9(5)					28(8)	5(3)		10(5)	42(5)		
2191.0(8)	19 ⁻										
2196.8(10)	(21 ⁺)										
2206.7(4)	(5 ⁺ , 3 ⁺)										

(continued)

¹³⁷Ce
58

E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage							
				E_f^* : $2J_f^\pi$:	0.0 3 ⁺	160.3 ⟨1⟩ ⁺	254 11 ⁻	434 ⟨3⟩ ⁺	514 ⟨3⟩ ⁺	763 ⟨5,3⟩ ⁺	837 ⟨5⟩ ⁺
2275.0(4)	3 ^{⟨+⟩}				16(5)	30(9)		14(7)		41(9)	
2293.5(7)	⟨1⟩										
2304.7(12)	3 ^{⟨+⟩}				19(8)	15(8)		35(8)			8(8)
2309.2(10)											
2335.7(12)	⟨21⟩										
2347.2(6)					30(10)	10(3)		40(13)	20(10)		
2454.1(3)	⟨1⟩										
2480.0(7)					15(5)	15(5)			30(10)		
2489.0(12)	21 ⁻										
2565.5(6)	⟨1⟩										
2587.5(10)											
2702.2(7)											
2767.7(9)	⟨1⟩										
2811.6(10)	⟨23⟩ ⁻										
2889.3(12)											
2970.7(12)											
3067.1	21 ⁺		00Zh27								
3224.1	23 ^{⟨+⟩}		00Zh27								
3414.7	25 ^{⟨+⟩}		00Zh27								
3702.5	27 ^{⟨+⟩}		00Zh27								
3985.3	27 ^{⟨+⟩}		00Zh27								
4173(3)											
4255.0	31 ^{⟨+⟩}		00Zh27								
4339(3)											
4585(3)											
4731.4	33 ^{⟨+⟩}		00Zh27								
5304.2	35 ^{⟨+⟩}		00Zh27								
5379.1 ^b	33 ^{⟨-⟩}		00Zh27								
5545.1 ^b	35 ^{⟨-⟩}		00Zh27								
5850.7 ^b	37 ^{⟨-⟩}		00Zh27								
6110.0	⟨37 ⁺ ⟩		00Zh27								
6321.1 ^b	39 ^{⟨-⟩}		00Zh27								
6459.0	⟨39 ⁺ ⟩		00Zh27								
6929.2 ^b	⟨41 ⁻ ⟩		00Zh27								
7660.3 ^b	⟨43 ⁻ ⟩		00Zh27								

Additional data on this isotope can be found in [00Zh39, 99Dr18, 77Lu04].

Two bands were proposed [00Zh27] in the level scheme of this nucleus (marked here a,b).

Energy levels and branching ratios [94Tu02]. Part 2

¹³⁷Ce
58

E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		E_f^* : $2J_f^\pi$:	867 ⟨5,3⟩	927.6 15 ⁻	1105.2 3	1144.4 13 ⁻	1179.5 ⟨5 ⁺ ⟩	1435.3	2039.1 19 ⁻	2191.0 19 ⁻	2196.8 ⟨21 ⁺ ⟩	2309.2
1476.6(4)	⟨5 ⁺ ,3 ⁺ ⟩		27(4)									
1800.5(2)			21(2)		4(2)							
1933.0(5)	3		3.3(11)				5.0(11)					
1980.5	15 ⁻					100						
2039.1(7) ^a	19 ⁻			100								
2113.4(4)			12(2)									
2134.3(4)	3 ⁽⁺⁾				3.6(7)		7.2(7)	4(2)				
2152.9(5)							15(5)					
2191.0(8)	19 ⁻			100								
2196.8(10)	⟨21 ⁺ ⟩								100			
2304.7(12)	3 ⁽⁺⁾				23(8)							
2309.2(10)									100			
2335.7(12)	⟨21⟩										100	
2480.0(7)			30(10)				10(5)					
2489.0(12)	21 ⁻								76(6)	24(2)		
2587.5(10)												100
2702.2(7)											100	
3224.1	23 ⁽⁺⁾										3(3)	

Energy levels and branching ratios [94Tu02]. Part 3

¹³⁷Ce
58

E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		E_f^* : $2J_f^\pi$:	2335.7 ⟨21⟩	2489.0 21 ⁻	2587.5	2702.2	2889.3	2970.7	3224.1 ⟨23⟩	3414.7 ⟨25⟩	3703 ⟨27⟩	4173
2811.6(10)	⟨23⟩ ⁻			100								
2889.3(12)					100							
2970.7(12)				100								
3224.1	23 ⁽⁺⁾		26(8)	43(4)		9(3)	18(9)					
3414.7	25 ⁽⁺⁾							9(2)	91(9)			
3702.5	27 ⁽⁺⁾									100		
4173(3)											100	
4255.0	31 ⁽⁺⁾										100	
4339(3)												100
4585(3)												100

Energy levels and branching ratios [94Tu02]. Part 4

¹³⁷Ce
58

E^*	$2J^\pi$	Branching ratios in percentage
[keV]		$E_f^*:$ 4255 $2J_f^\pi:$ $\langle 31 \rangle$
4731.4	$33^{(+)}$	100

Energy levels and branching ratios [03So13].

¹³⁸Ce
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E^*	J^π	L	ε	S_α	σ (d, ⁶ Li)	γ_α^2	$T_{1/2}$ or	Ref.
[keV]		(p,t)	(p,t)	(d, ⁶ Li)	$\mu\text{b/sr}$	[keV]	Γ_{cm}	
0.0	0^+	0	19.3	0.078	4.44(42)	0.54	$\geq 0.9 \cdot 10^{14}$ yr	77Sh06
788.744(8)	2^+	2	18.3	0.15	2.04(28)	0.84	2.97(20) ps	77Sh06
1476.93(9)	0^+							
1510.58(14)	2^+	2	3.0					77Sh06
1826.48(10)	4^+	4	5.7					77Sh06
2129.17(12)	7^-	7	4.6				8.65(20) ms	77Sh06
2136.82(15)	4^+							
2177.26(16)	$\langle 3^+ \rangle$							
2217.33(12)	5^-	5	20.6				<0.3 ns	77Sh06
2236.54(15)	$\langle 1, 2^+ \rangle$							
2293.70(13)	6^+							
2339.85(10)	0^+	0	2.7					77Sh06
2393.83(24)	$\langle 3^- \rangle$	3	8.7					77Sh06
2396.08(22)	6^+							
2443.68(25)	4^+	4	1.3					77Sh06
2470.99(15)	$\langle 1, 2^+ \rangle$							
2471.46(19)	$\langle 4^+ - 6^+ \rangle$							
2526.0(8)	$\langle 9 \rangle$							
2592.79(25)								
2642.4(3)	2^+	2	3.9					77Sh06
2719(15)	$\langle 4^+, 5^- \rangle$	4,5	0.9,2.6					77Sh06
2733.29(18)	6^+							
2748.56(19)	5^+							
2764.84(14)	6^-							
2885(16)	$\langle 2^+, 3^- \rangle$	2,3	3.9,28					77Sh06
2899.15(18)	6^-							
2903.21(20)	$\langle 1, 2^+ \rangle$							
2907.19(22)								
2942(16)	$\langle 4^+, 5^- \rangle$	4,5	4.1,12					77Sh06
2950.4(3)	$\langle 2^- - 4^- \rangle$							
2995.69(22)	$2^+ - 6^+$							
3005(16)	$\langle 4^+, 5^- \rangle$	4,5	3.1,9.2					77Sh06
3082(19)	$\langle 4^+, 5^- \rangle$	4,5	0.8,2.1					77Sh06
3108.98(18)	8^+							
3176.00(24)								

(continued)

¹³⁸Ce
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E^*	J^π	L	ε	S_α	σ (d, ⁶ Li)	γ_α^2	$T_{1/2}$ or	Ref.
[keV]		(p,t)	(p,t)	(d, ⁶ Li)	$\mu\text{b/sr}$	[keV]	Γ_{cm}	
3177.4(7)								
3213.90(24)								
3220(16)	$\langle 2^+, 3^- \rangle$	2,3	3.4,29					77Sh06
3229.6(3)								
3277(16)	$\langle 3^- \rangle$	$\langle 3 \rangle$	21.6					77Sh06
3356(18)	$\langle 2^+, 3^- \rangle$	2,3	3.7,28					77Sh06
3367.8(4)								
3429(16)	$\langle 4^+, 5^- \rangle$	4,5	1.2,3.9					77Sh06
3430.4(3)	$\langle 7 \rangle^+$							
3531(16)								
3539.1(3)	10^+						81(2) ns	
3646(16)	$\langle 7^- \rangle$	$\langle 7 \rangle$	1.8					77Sh06
3670.5(3)	$\langle 6, 7^- \rangle$							
3800.5(4)	$\langle 6, 7^- \rangle$							
3926.6(5)	$\langle 6, 7^- \rangle$							
3942.2(4)	$\langle 11^+ \rangle$						<1.5 ns	
4050.0(3)								
4157.1(5)	6,7,8							
4248.0(7)	$\langle 6, 7^- \rangle$							
4359.6(4)	$\langle 12^+ \rangle$							
4974.2(5)	$\langle 13^+ \rangle$							
5089.2(5)	$\langle 12^+ \rangle$							
5213.7(5)	$\langle 13^+ \rangle$							
5312.0(5)	$\langle 14^+ \rangle$							
5412.3(6)								
5566.1(6)	$\langle 15 \rangle$							
5731.6(6)								
6013.5(7)	$\langle 16 \rangle$							
6685.1(10)	$\langle 16^+ \rangle$							
6841.0(9)	$\langle 17^+ \rangle$							
6888.2(10)	$\langle 17^+ \rangle$							
7103.9(10)	$\langle 18^+ \rangle$							
7210.0(15)	$\langle 18^+ \rangle$							
7682.2(14)	$\langle 19^+ \rangle$							
7684.5(18)	$\langle 19^+ \rangle$							
7802.5(18)	$\langle 20^+ \rangle$							
8349.1(20)	$\langle 20^+ \rangle$							
8873.1(20)	$\langle 22^+ \rangle$							
0+X	$\langle 13^- \rangle$							
146.5+X	$\langle 14^- \rangle$							
408.8+X	$\langle 15^- \rangle$							
798.8+X	$\langle 16^- \rangle$							
1294.8+X	$\langle 17^- \rangle$							

(continued)

¹³⁸Ce
58

E^*	J^π	L	ε	S_α	σ (d, ⁶ Li)	γ_α^2	$T_{1/2}$ or	Ref.
[keV]		(p,t)	(p,t)	(d, ⁶ Li)	$\mu\text{b/sr}$	[keV]	Γ_{cm}	
1869.8+X	$\langle 18^- \rangle$	77Sh06	77Sh06					Ref.

Abundance: 0.251(2) %.

Additional data on this isotope can be found in [72Sh21].

Energy levels and branching ratios [03So13]. Part 2

¹³⁸Ce
58

E^*	J^π	Branching ratios in percentage									
		E_f^* :	0.0	789	1477	1511	1826	2129	2137	2217.3	2293.7
[keV]		J_f^π :	0 ⁺	2 ⁺	0 ⁺	2 ⁺	4 ⁺	7 ⁻	4 ⁺	5 ⁻	6 ⁺
788.744(8)	2 ⁺		100								
1476.93(9)	0 ⁺		x	100							
1510.58(14)	2 ⁺		53(7)	47(6)							
1826.48(10)	4 ⁺			100							
2129.17(12)	7 ⁻						100				
2136.82(15)	4 ⁺			100							
2177.26(16)	$\langle 3^+ \rangle$			77(4)		23(2)					
2217.33(12)	5 ⁻						93(5)	5.2(13)	1.9(7)		
2236.54(15)	$\langle 1,2^+ \rangle$		38(6)	62(8)							
2293.70(13)	6 ⁺						17.1(6)	58(3)	5(1)	20(6)	
2339.85(10)	0 ⁺			100							
2393.83(24)	$\langle 3^- \rangle$									100	
2396.08(22)	6 ⁺						100				
2443.68(25)	4 ⁺					100					
2470.99(15)	$\langle 1,2^+ \rangle$		60(11)	40(8)							
2471.46(19)	$\langle 4^+-6^+ \rangle$								59(3)		41(9)
2526.0(8)	$\langle 9 \rangle$							100			
2592.79(25)				44(10)		56(10)					
2642.4(3)	2 ⁺		26(11)	74(15)							
2733.29(18)	6 ⁺						84(3)				16(3)
2748.56(19)	5 ⁺								57(14)		43(7)
2764.84(14)	6 ⁻							25(1)		75(4)	
2899.15(18)	6 ⁻							67(5)		33(5)	
2903.21(20)	$\langle 1,2^+ \rangle$			76(15)	24(12)						
2907.19(22)							100				
2995.69(22)	2 ⁺ -6 ⁺						100				
3108.98(18)	8 ⁺							32(1)			68(2)
3176.00(24)											100
3177.4(7)			100								
3213.90(24)											100
3367.8(4)								[100]			
3670.5(3)	$\langle 6,7^- \rangle$							≤ 62		100	

(continued)

 $^{138}_{58}\text{Ce}$

E^*	J^π	Branching ratios in percentage									
[keV]		E^*_f : J^π_f :	0.0 0^+	789 2^+	1477 0^+	1511 2^+	1826 4^+	2129 7^-	2137 4^+	2217.3 5^-	2293.7 6^+
3800.5(4)	$\langle 6, 7^- \rangle$							46(4)		54(6)	
3926.6(5)	$\langle 6, 7^- \rangle$							53(5)		47(5)	
4157.1(5)	6,7,8							56(18)			
4248.0(7)	$\langle 6, 7^- \rangle$							40(15)		60(40)	

Energy levels and branching ratios [03So13]. Part 3

 $^{138}_{58}\text{Ce}$

E^*	J^π	Branching ratios in percentage									
[keV]		E_f^* : J_f^π :	2393.8 $\langle 3^- \rangle$	2471.46	2526.0 $\langle 9 \rangle$	2733.3 6^+	2764.84 6^-	3108.98 8^+	3539.1 10^+	3942.2 $\langle 11^+ \rangle$	4359.6 $\langle 12^+ \rangle$
2950.4(3)	$\langle 2^- - 4^- \rangle$		100								
3229.6(3)				100							
3430.4(3)	$\langle 7 \rangle^+$					100					
3539.1(3)	10^+							100			
3942.2(4)	$\langle 11^+ \rangle$				x				100		
4050.0(3)								100			
4157.1(5)	6,7,8						44(5)				
4359.6(4)	$\langle 12^+ \rangle$									100	
4974.2(5)	$\langle 13^+ \rangle$										100
5089.2(5)	$\langle 12^+ \rangle$									100	
5213.7(5)	$\langle 13^+ \rangle$										85(11)

Energy levels and branching ratios [03So13]. Part 4

 $^{138}_{58}\text{Ce}$

E^*	J^π	Branching ratios in percentage										
[keV]		$E_f^*:$ $J_f^\pi:$	4974.2 $\langle 13^+ \rangle$	5089.2 $\langle 12^+ \rangle$	5213.7 $\langle 13^+ \rangle$	5312.0 $\langle 14^+ \rangle$	5412.3	5566.1 $\langle 15 \rangle$	6013.5 $\langle 16 \rangle$	6685.1 $\langle 16^+ \rangle$	6841.0 $\langle 17^+ \rangle$	6888.2 $\langle 17^+ \rangle$
5213.7(5)	$\langle 13^+ \rangle$			15(4)								
5312.0(5)	$\langle 14^+ \rangle$		47(24)		53(7)							
5412.3(6)					100							
5566.1(6)	$\langle 15 \rangle$					100						
5731.6(6)							100					
6013.5(7)	$\langle 16 \rangle$							100				
6685.1(10)	$\langle 16^+ \rangle$							x				
6841.0(9)	$\langle 17^+ \rangle$							x	x			
6888.2(10)	$\langle 17^+ \rangle$								x	x		
7103.9(10)	$\langle 18^+ \rangle$								x		x	
7210.0(15)	$\langle 18^+ \rangle$											x

Energy levels and branching ratios [03So13]. Part 5

¹³⁸Ce
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E^*	J^π	Branching ratios in percentage										
[keV]		E_f^* : J_f^π :	7103.9 $\langle 18^+ \rangle$	7210.0 $\langle 18^+ \rangle$	7682.2 $\langle 19^+ \rangle$	7684.5 $\langle 19^+ \rangle$	7802.5 $\langle 20^+ \rangle$	0+X $\langle 13^- \rangle$	146.5+X $\langle 14^- \rangle$	408.8+X $\langle 15^- \rangle$	798.8+X $\langle 16^- \rangle$	1295+X $\langle 17^- \rangle$
<hr/>												
7682.2(14)	$\langle 19^+ \rangle$	x										
7684.5(18)	$\langle 19^+ \rangle$		x									
7802.5(18)	$\langle 20^+ \rangle$			x								
8349.1(20)	$\langle 20^+ \rangle$				x							
8873.1(20)	$\langle 22^+ \rangle$					x						
146.5+X	$\langle 14^- \rangle$							x				
408.8+X	$\langle 15^- \rangle$								x			
798.8+X	$\langle 16^- \rangle$									x		
1294.8+X	$\langle 17^- \rangle$										x	
1869.8+X	$\langle 18^- \rangle$											x
<hr/>												

Energy levels and branching ratios [01Bu16].

¹³⁹Ce
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E^*	$2J^\pi$	L	C^2S	C^2S	C^2S	C^2S	σ (p,d)	S_N	S_N	Ref.	Branching ratios in percentage					
[keV]		(d,t)	(d,t)	(p,d)	(p,d)	(p,d)	$\mu\text{b/sr}$	(p,d)	$rel.$		E_f^* : $2J_f^\pi$:	0.0 3 ⁺	255 1 ⁺	754 11 ⁻	1320 5 ⁺	1631 3 ⁺
0.0	3 ⁺	2	4.4	3.4	1.8	1.6	2800	4.6	4.0	76Be10						
255.10(2)	1 ⁺	0	1.5	1.8	1.1	1.0	3650	1.6	1.4	76Be10	100					
754.2(1)	11 ⁻	5	6.9	7.3	2.4	1.8	2500	8.1	7.0	76Be10	100					
1320.25(2)	5 ⁺	2	2.5	2.0	1.1	2.1	1700	3.0	2.6	76Be10	97(1)	3(2)				
1347.34(1)	7 ⁺	4	1.4							76Be10	100					
1578.3(2)	7 ⁻														100	
1596.59(2)	3 ⁺	2					370	0.7	0.6	76Be10	88(7)	12(6)				
1630.68(2)	3 ⁺	2					incl			76Be10	69(2)	31(2)				
1790	1 ⁺	0	0.08				150	0.08	0.07	76Be10						
1818.49(3)	3 ⁺ ,5 ⁺	2	0.1							76Be10			100			
1842.9(10)	7 ⁻														100	
1889	1 ⁺	0	0.23							76Be10						
1907.68(2)	3 ⁺	2	0.74	1.05	0.28	0.60	700	1.2	1.1	76Be10	27(3)	62(4)			11(4)	
1965.4(2)	3,5 ⁺										≤42	100				
1984.9(1)	3,5 ⁺										≤3	43(7)			≤14	57(11)
2016.27(4)	3 ⁺										100				≤24	
2028.6	11 ⁻ ,13 ⁻													x		
2090.5	3 ⁺ ,5 ⁺	2	0.59				310	1.1	0.9	76Be10						
2143	3 ⁺ ,5 ⁺	2	0.23				incl			76Be10						
2251	7 ⁺ ,9 ⁺	4	0.36							76Be10						
2286	9 ⁻ ,11 ⁻	5	1.8				440	2.0	1.8	76Be10						
2361.8	15 ⁻														100	
2363	7 ⁺ ,9 ⁺	4	0.65				100			76Be10						
2426	3 ⁺ ,5 ⁺	2	0.11							76Be10						
2455	7 ⁺ ,9 ⁺	4	0.4				100			76Be10						
2483.6	13 ⁻ ,15 ⁻														100	

(continued)

¹³⁹Ce
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E^*	$2J^\pi$	L	C^2S	C^2S	C^2S	C^2S	σ (p,d)	S_N	S_N	Ref.	Branching ratios in percentage					
[keV]		(d,t)	(d,t)	(p,d)	(p,d)	(p,d)	$\mu\text{b/sr}$	(p,d)	rel.		E_f^* :	0.0	255	754	1320	1631
											$2J_f^\pi$:	3 ⁺	1 ⁺	11 ⁻	5 ⁺	3 ⁺
2488																
2556	$\langle 9 \rangle^+$			1.6	0.44	0.80	88	2.0	1.8							
2610																
2631.0	$\langle 19^- \rangle$															
2701																
2800	7 ⁺ ,9 ⁺	4	0.41	2.7	0.90	0.63	137	3.2	2.7	76Be10						
2818.8	$\langle 21 \rangle$															
2822.5	9 ⁻ ,11 ⁻	5	1							76Be10						
2910	3 ⁺ ,5 ⁺	2					230	0.5	0.4	76Be10						
2964	3 ⁺ ,5 ⁺	2	0.06				incl			76Be10						
3082	$\langle 7^+,9^+ \rangle$	$\langle 4 \rangle$	0.2							76Be10						
3144	1 ⁺	0	0.03							76Be10						
3172	3 ⁺ ,5 ⁺	2	0.07				410	3.0	2.6	76Be10						
3184.6	$\langle 23 \rangle$															
3196	$\langle 7^+,9^+ \rangle$	$\langle 4 \rangle$	0.82							76Be10						
3282	7 ⁺ ,9 ⁺	4	0.69							76Be10						
3302	1 ⁺	0	0.02							76Be10						
3327		2								76Be10						
3352		2+4					690			76Be10						
3405	$\langle 1^+ \rangle$	$\langle 0 \rangle$	0.016							76Be10						
3481.2	$\langle 25 \rangle$															
3535	3 ⁺ ,5 ⁺	2	0.08							76Be10						
3592	3 ⁺ ,5 ⁺	2	0.09							76Be10						
3655	3 ⁺ ,5 ⁺	2	0.12							76Be10						
3701.4	$\langle 27 \rangle$															
3852	3 ⁺ ,5 ⁺	2	0.12							76Be10						
4262.5	$\langle 3^+,5^+ \rangle$	$\langle 2 \rangle$	0.08							76Be10						
			76Be10		68Ya07	85Di12	71Jo05	71Jo05	71Jo05	Ref.						

Additional data on this isotope can be found in [77Lu04, 76Za03, 75Cl05].

Energy dependence of C^2S for the (p,d) reaction is discussed in [85Di12].

Data for this isotope are considered in vol. LB I/18B.

Energy levels and branching ratios [01Bu16]. Part 2

¹³⁹Ce
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E^*	$2J^\pi$	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		Γ_{cm}		E^*_f :	2029	2362	2631	2818.8	2822.5	3184.6	3481.2
				$2J^\pi_\text{f}$:		$\langle 15^- \rangle$	$\langle 19^- \rangle$	$\langle 21 \rangle$	$9^-, 11^-$	$\langle 23 \rangle$	$\langle 25 \rangle$
0.0	3^+	137.64(2) d	76Be10								
255.10(2)	1^+	110(20) ps	76Be10								
754.2(1)	11^-	55(1) s	76Be10								
1320.25(2)	5^+		76Be10								
1347.34(1)	7^+		76Be10								

(continued)

¹³⁹Ce
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E^*	$2J^\pi$	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		Γ_{cm}		E_{f}^* : $2J_{\text{f}}^\pi$:	2029	2362 $\langle 15^- \rangle$	2631 $\langle 19^- \rangle$	2818.8 $\langle 21 \rangle$	2822.5 $9^-, 11^-$	3184.6 $\langle 23 \rangle$	3481.2 $\langle 25 \rangle$
1578.3(2)	7^-										
1596.59(2)	$\langle 3 \rangle^+$		76Be10								
1630.68(2)	3^+		76Be10								
1790	$\langle 1^+ \rangle$		76Be10								
1818.49(3)	$3^+, 5^+$		76Be10								
1842.9(10)	$\langle 7^- \rangle$										
1889	1^+		76Be10								
1907.68(2)	$\langle 3 \rangle^+$		76Be10								
1965.4(2)	$3, 5^+$										
1984.9(1)	$3, 5^+$										
2016.27(4)	$\langle 3^+ \rangle$										
2028.6	$11^-, 13^-$										
2090.5	$3^+, 5^+$		76Be10								
2143	$3^+, 5^+$		76Be10								
2251	$7^+, 9^+$		76Be10								
2286	$9^-, 11^-$		76Be10								
2361.8	$\langle 15^- \rangle$			x							
2363	$7^+, 9^+$		76Be10								
2426	$3^+, 5^+$		76Be10								
2455	$7^+, 9^+$		76Be10								
2483.6	$13^-, 15^-$										
2488											
2556	$\langle 9 \rangle^+$										
2610											
2631.0	$\langle 19^- \rangle$	70(5) ns				100					
2701											
2800	$7^+, 9^+$		76Be10								
2818.8	$\langle 21 \rangle$	≤ 3.0 ns					100				
2822.5	$9^-, 11^-$		76Be10								
2910	$3^+, 5^+$		76Be10								
2964	$3^+, 5^+$		76Be10								
3082	$\langle 7^+, 9^+ \rangle$		76Be10								
3144	1^+		76Be10								
3172	$3^+, 5^+$		76Be10								
3184.6	$\langle 23 \rangle$					≤ 25	100				
3196	$\langle 7^+, 9^+ \rangle$		76Be10								
3282	$7^+, 9^+$		76Be10								
3302	1^+		76Be10								
3327			76Be10								
3352			76Be10								
3405	$\langle 1^+ \rangle$		76Be10								
3481.2	$\langle 25 \rangle$								x	100	
3535	$3^+, 5^+$		76Be10								
3592	$3^+, 5^+$		76Be10								
3655	$3^+, 5^+$		76Be10								

(continued)

¹³⁹Ce
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E^*	$2J^\pi$	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		Γ_{cm}		$E_f^*:$ $2J_f^\pi:$	2029	2362 $\langle 15^- \rangle$	2631 $\langle 19^- \rangle$	2818.8 $\langle 21 \rangle$	2822.5 $9^-, 11^-$	3184.6 $\langle 23 \rangle$	3481.2 $\langle 25 \rangle$
3701.4	$\langle 27 \rangle$									54(18)	46(5)
3852	$3^+, 5^+$		76Be10								
4262.5	$\langle 3^+, 5^+ \rangle$		76Be10 Ref.								

Energy levels and branching ratios [94Pe19].

¹⁴⁰Ce
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E^*	J^π	L	σ (t,p)	L	C^2S'	L	C^2S	ε	σ (p,t)	L	ε	Γ_o^2/Γ	$B(E1)$	S_α	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(τ, d)		(d, τ)	($^{14}\text{C}, ^{16}\text{O}$)	$\mu\text{b/sr}$	(p,t)	(p,t)	[meV]	$10^{-3}ef$	(d, ^6Li)	
0.0	0^+	0	210	4	6.49	2	0.62	15	765	0	19.3			0.060	72Mu09
1596.23(3)	2^+	2	34	2	0.83	2+4	0.3	3	167	2	2.3	5.0(4)		0.018	71Jo16
1903.31(6)	0^+		14			2	0.07	<0.2	88	0	2.1				71Jo16
2083.25(3)	4^+					2	0.12			4	0.28				77Sh06
2107.85(3)	6^+			2	14.0	4	2.20								71Jo16
2347.88(3)	2^+			2	6.97	2	0.12	<0.2							71Jo16
2349.81(3)	5^+														
2412.01(3)	3^+			2	4.53	4	2.35								71Jo16
2464.08(4)	3^-		33					6	38						72Mu09
2480.92(3)	4^+			2	4.13										71Jo16
2515.76(3)	$3^+, 4^+$									3,4	2,0.2				77Sh06
2521.43(3)	2^+			2	3.63	2	0.83								71Jo16
2547.23(4)	1^+					4	1.24								71Jo16
2628.88(6)	6^+			4	17.2										71Jo16
2658.3(15)															
2899.65(15)	2^+			2	0.78					2	0.46	4.0(9)			71Jo16
3001.11(14)	2^+					2	0.07								71Jo16
3016.8(5)	0^+		19						31	0	1.1				72Mu09
3040	3^-							<0.2							
3118.55(16)	2^+		9	2	3.4					2		13(1)			71Jo16
3168.3(15)															
3226(2)	0^+	0	212						526	0	13.8				72Mu09
3255.8(7)	5^-			5	4.17										71Jo16
3320.4(6)	2^+			0	2.7							3.0(7)			71Jo16
3331(6)	4^+		40	2	1.24										71Jo16
3391.4(13)															
3394.68(9)	$\langle 4^- \rangle$														
3395.1(10)	$\langle 4^+ \rangle$														
3424.6(7)	7^-			5	13.4										71Jo16
3432.8(10)	7^+														
3473.6(2)	3^-			5	35.9										71Jo16
3476.9(7)	8^-														

(continued)

¹⁴⁰Ce
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E^*	J^π	L	σ (t,p)	L	C^2S'	L	C^2S	ε	σ (p,t)	L	ε	Γ_0^2/Γ	$B(E1)$	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(τ ,d)		(d, τ)	(¹⁴ C, ¹⁶ O)	$\mu\text{b/sr}$	(p,t)	(p,t)	[meV]	$10^{-3}ef$	
3484.2(10)	6 ⁺													
3493.0(7)	9 ⁻													
3512.9(8)	8 ⁺													
3520.86(14)	$\langle 4^+ \rangle$													
3522.4	$\langle 5 \rangle$			5	20.6									71Jo16
3534.0	$\langle 3,4 \rangle$								33					
3551(3)	2 ⁺ ,3 ⁻	$\langle 2 \rangle$	31							2,3	2,10			72Mu09
3602														
3620.9(7)	8 ⁺													
3643.8(6)	1 ⁻											367(56)	21.7(33)	06Vo0A
3653(3)	2 ⁺ ,3 ⁻		32						66	2,3	1,3,9			77Sh06
3661.2	$\langle 7,8 \rangle$													
3710(4)	5 ⁻		52	5	12.5				30					71Jo16
3715.3(9)	10 ⁺													
3729(2)	2 ⁺	2	230						320	2	15,69			77Sh06
3746(2)			$\langle 60 \rangle$						$\langle 80 \rangle$					72Mu09
3780	$\langle 3^+,4^+ \rangle$		25	2+0	4.7*									71Jo16
3792(4)	3 ⁻									3	10.6			77Sh06
3895.3(1)	9 ⁺													
3911(10)	4 ⁺ ,5 ⁻		14	5	4.45					4,5	0,4,1			71Jo16
3912(4)	2 ⁻													
3956(4)									44	2				
3970.8(10)														
3980	3 ⁻									3	10.1			77Sh06
4000(4)	4 ⁻													
4017(10)				2+0	5.6*									71Jo16
4053	1											x	1.2(2)	06Vo0A
4125(10)	2 ⁺		22	0	7.33				42	2	1.1			71Jo16
4158(4)	2 ⁻													
4170(2)			32	0										71Jo16
4173.6(8)	1											128(25)	5.1(10)	06Vo0A
4183(10)	2 ⁺								30	2	1.3			77Sh06
4208(6)														
4242(10)	2 ⁺ ,1 ⁻		8	9	3.7*				40	1,2	4,6,2			71Jo16
4263.5(11)	10 ⁺													
4296(6)	3 ⁻ ,4 ⁺								24	3,4	12,1			77Sh06
4331	1											x	0.8(1)	06Vo0A
4354.9(7)	1											122(26)	4.3(9)	06Vo0A
4360(10)	X ⁺			2	17.8									71Jo16
4364(4)	1 ⁻													
4371	1											x	1.9(3)	06Vo0A
4388	1											x	0.6(1)	06Vo0A
4424(4)	2 ⁺ ,3 ⁻								30	2,3	1,8			77Sh06
4437	1											x	2.2(3)	06Vo0A
4449.5(13)	$\langle 9,11 \rangle$													

(continued)

¹⁴⁰Ce
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E^*	J^π	L	σ (t,p)	L	C^2S'	L	C^2S	ε	σ (p,t)	L	ε	Γ_o^2/Γ	$B(E1)$	S_α	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(τ ,d)		(d, τ)	(¹⁴ C, ¹⁶ O)	$\mu\text{b/sr}$	(p,t)	(p,t)	[meV]	$10^{-3}ef$	(d, ⁶ Li)	
4450(10)															
4485(10)															
4514.9(9)	1											168(31)	5.3(10)		06Vo0A
4538(4)	3 ⁻								3	8.7					77Sh06
4571.3(13)	$\langle 8^+, 10^+ \rangle$														
4580(4)	2 ⁻														
4640(10)															
4655	1											x	0.8(1)		
4700(10)															
4720(15)															
4748(4)	2 ⁻														
4760(15)															
4770(10)	1 ⁻														
4787.8(9)	1											199(38)	5.2(10)		06Vo0A
4827(10)	2 ⁺ , 3 ⁻								149	2	11				77Sh06
4852.3(11)	12 ⁺														
4860(10)															
4875	1											x	0.5(1)		06Vo0A
4883	1											x	0.4(1)		06Vo0A
4905.3(12)	11 ⁻														
4910(15)															
4951	1											x	0.8(1)		06Vo0A
4958.9(10)	$\langle 11^+ \rangle$														
4979(10)	2 ⁺ , 3 ⁻								2,3	4.6,29					77Sh06
5000(15)															
5026(6)	2 ⁻ , 3 ⁻														
5050(15)															
5070.5(13)	$\langle 9, 11 \rangle$														
5094.1(12)	$\langle 12^- \rangle$														
5101(10)	≥ 5								≥ 5						77Sh06
5103.6(13)	13 ⁻														
5140(15)															
5157.3(12)	1											177(31)	3.7(7)		06Vo0A
5190.2(10)	1											222(46)	4.6(9)		06Vo0A
5196(6)	2 ⁻ , 3 ⁻														
5211.6(14)	1											132(35)	2.7(7)		06Vo0A
5230(15)									2=4						77Sh06
5245	1											x	1.9(3)		06Vo0A
5295(10)	5 ⁻ , 6 ⁺								5,6	5,2					77Sh06
5330	1											x	2.5(4)		06Vo0A
5336.2(13)	$\langle 12^- \rangle$														
5337.3(9)	1											253(51)	4.8(10)		06Vo0A
5377(10)	4 ⁺ , 5 ⁻								4,5	2,6					77Sh06
5424(6)	2 ⁻ , 3 ⁻														
5449(10)															

(continued)

¹⁴⁰Ce
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E^*	J^π	L	σ (t,p)	L	C^2S'	L	C^2S	ε	σ (p,t)	L	ε	Γ_o^2/Γ	$B(E1)$	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(τ, d)		(d, τ)	(¹⁴ C, ¹⁶ O)	$\mu\text{b/sr}$	(p,t)	(p,t)	[meV]	$10^{-3}ef$	
5466(6)	2 ⁻ , 3 ⁻													
5470	1											x	1.1(2)	06Vo0A
5494	1											x	1.0(2)	06Vo0A
5548.4(7)	1											470(80)	7.9(14)	06Vo0A
5573.8(14)	1											271(59)	4.5(10)	06Vo0A
5574(15)	$\langle 0^+ \rangle$									$\langle 0 \rangle$	$\langle 2,3 \rangle$			77Sh06
5650(15)	2 ⁺ , 3 ⁻									2,3	2,11			77Sh06
5624	1											x	2.5(5)	06Vo0A
5659.9(6)**	1 ⁻											1646(254)	26.0(40)	06Vo0A
5703(15)	1 ⁻ , 2 ⁺									1,2	6,2			77Sh06
5721	1											x	1.5(3)	06Vo0A
5759	1											x	1.2(3)	06Vo0A
5789(15)										2=4				77Sh06
5809	1											x	2.9(6)	06Vo0A
5823	1											x	2.1(5)	06Vo0A
5896(15)	1 ⁻ , 2 ⁺									1,2	7,2			77Sh06
5928.6(10)	1											391(80)	5.4(11)	06Vo0A
5940	1											x	2.1(5)	06Vo0A
5989(15)	$\langle 3^-, 4^+ \rangle$									3,4	15,2			77Sh06
6029	1											x	2.6(7)	06Vo0A
6078(15)	2 ⁺ , 3 ⁻									2,3	3,21			77Sh06
6119.1(15)	1											655(112)	8.2(14)	06Vo0A
6130.6(12)	1											302(62)	3.8(8)	06Vo0A
6161.7(14)	1											421(97)	5.2(12)	06Vo0A
6187(15)	2 ⁺ , 3 ⁻									2,3	2,14			77Sh06
6226	1											x	2.1(9)	06Vo0A
6245	1											x	2.7(8)	06Vo0A
6255	1											x	3.9(16)	06Vo0A
6268(15)										3=5				77Sh06
6273.6(10)	1											434(81)	5.0(9)	06Vo0A
6295.3(8)	1											989(176)	11.4(20)	06Vo0A
6327.8(12)	1											350(129)	4.0(15)	06Vo0A
6343.3(11)	1											583(113)	6.6(13)	06Vo0A
6752.7(10)	1											664(123)	7.4(14)	06Vo0A
6364(15)	3 ⁻ , 4 ⁺									3,4	18,2			77Sh06
6397.2(8)	1											1588(257)	17.4(28)	06Vo0A
6439.9(14)	1											852(146)	9.1(16)	06Vo0A
6449.9(15)	1											502(99)	5.4(11)	06Vo0A
6458.5(15)	1											454(94)	4.8(10)	06Vo0A
6484.8(10)	1											447(91)	4.7(10)	06Vo0A
6497.0(7)	1											1370(228)	14.3(24)	06Vo0A
6535.8(6)	1											2059(321)	21.1(33)	06Vo0A
6549.1(11)	1											358(75)	3.7(8)	06Vo0A
6574.9(15)	1											392(77)	4.0(8)	06Vo0A
6605.5(10)	1											658(113)	6.5(11)	06Vo0A

(continued)

¹⁴⁰₅₈Ce

E^*	J^π	L	σ (t,p)	L	C^2S'	L	C^2S	ε	σ (p,t)	L	ε	Γ_o^2/Γ	$B(E1)$	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$		(τ ,d)		(d, τ)	(¹⁴ C, ¹⁶ O)	$\mu\text{b/sr}$	(p,t)	(p,t)	[meV]	$10^{-3}ef$	
6616.2(10)	1											610(106)	6.0(11)	06Vo0A
6678														
6781.9(15)	1											531(116)	4.9(11)	06Vo0A
6841.8(12)	1											575(158)	5.2(14)	06Vo0A
6862.4(7)	1											1863(321)	16.5(29)	06Vo0A
6905.9(15)	1											1009(220)	8.8(19)	06Vo0A
6932.6(14)	1											876(189)	7.5(16)	06Vo0A
6960.4(12)	1											962(199)	8.2(17)	06Vo0A
7050														
7206.0(14)	1											1434(244)	11.0(19)	06Vo0A
7214.8(15)	1											1332(227)	10.2(17)	06Vo0A
7341.5(14)	1											507(197)	3.7(14)	06Vo0A
7370	0 ⁺													
7673.4(12)	1											599(140)	3.8(9)	06Vo0A
			72Mu09		71Jo16		71Jo16		77Sh06	77Sh06	77Sh06	95He25	95He25	Ref.
								82Pe13						Ref.

Additional data on this isotope can be found in [04Zi01, 04En0A, 03Ha33, 02Zi05, 01Er09, 01Ch03, 97He01, 96Zi02, 95He25, 72Ba02].

Abundance: 88.450(18) %.

* Presence of unresolved doublets prevents establishing of the correspondence between levels.

** Level observed by photoexcitation [72Wo21] with $\Gamma_o/\Gamma=0.95(5)$ and $\Gamma_\gamma=11(3)$ meV.

Data for this isotope are considered in vol. LB I/18B.

Energy levels and branching ratios [94Pe19]. Part 2

¹⁴⁰₅₈Ce

E^*	J^π	σ (d, ⁶ Li)	γ_α^2	$T_{1/2}$ or	Ref.	Branching ratios in percentage						
[keV]		$\mu\text{b/sr}$	[keV]	Γ_{cm}		E_f^* : 0.0	1596	1903	2083	2108	2348	2350
						J_f^π : 0 ⁺	2 ⁺	0 ⁺	4 ⁺	6 ⁺	2 ⁺	5 ⁺
0.0	0 ⁺	6.10(44)	1.00	Stable	72Mu09							
1596.23(3)	2 ⁺	0.92(24)	0.21	0.08(1) ps	71Jo16	100						
1903.31(6)	0 ⁺			0.40(3) ns	71Jo16	x	100					
2083.25(3)	4 ⁺			3.45(3) ns	77Sh06	0.025(2)	100(2)					
2107.85(3)	6 ⁺			7(2) μs	71Jo16				100			
2347.88(3)	2 ⁺			≤ 0.2 ns	71Jo16	16.7(2)	83(1)	0.07(2)				
2349.81(3)	5 ⁺			≤ 10 ns					52(10)	48(10)		
2412.01(3)	3 ⁺			55(15) ps	71Jo16		53(1)		47(1)		0.02(1)	
2464.08(4)	3 ⁻			0.10(2) ps	72Mu09	0.14(1)	100					
2480.92(3)	4 ⁺			3.2(3) ns	71Jo16				13.0(5)			74(1)
2515.76(3)	3 ⁺ , 4 ⁺				77Sh06		48(1)		52(1)			
2521.43(3)	2 ⁺			≤ 0.1 ns	71Jo16	32.1(5)	65(1)	0.12(3)	≤ 0.01		1.07(9)	
2547.23(4)	1 ⁺				71Jo16	16.5(8)	84(1)					
2628.88(6)	6 ⁺				71Jo16					100		x

(continued)

¹⁴⁰Ce
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E^* [keV]	J^π	σ (d, ⁶ Li) $\mu\text{b/sr}$	γ_α^2 [keV]	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage							
						E_f^* : J_f^π :	0.0 0 ⁺	1596 2 ⁺	1903 0 ⁺	2083 4 ⁺	2108 6 ⁺	2348 2 ⁺	2350 5 ⁺
2658.3(15)										x			
2899.65(15)	2 ⁺			28(2) fs	71Jo16	59(1)	41(5)						
3001.11(14)	2 ⁺				71Jo16		75(9)	25(5)					
3016.8(5)	0 ⁺				72Mu09	x	100						
3040	3 ⁻												
3118.55(16)	2 ⁺			26(5) meV	71Jo16	100							
3168.3(15)									x				
3226(2)	0 ⁺				72Mu09								
3255.8(7)	5 ⁻				71Jo16								
3320.4(6)	2 ⁺			19(4) meV	71Jo16	100							
3331(6)	4 ⁺				71Jo16								
3391.4(13)										100			
3394.68(9)	$\langle 4^- \rangle$												64
3395.1(10)	$\langle 4^+ \rangle$												
3424.6(7)	7 ⁻				71Jo16						100		
3432.8(10)	7 ⁺												100
3473.6(2)	3 ⁻				71Jo16		83(12)						
3476.9(7)	8 ⁻												
3484.2(10)	6 ⁺												100
3493.0(7)	9 ⁻			1.7(2) ns						x			
3512.9(8)	8 ⁺									100			
3520.86(14)	$\langle 4^+ \rangle$						100						
3522.4	$\langle 5 \rangle$				71Jo16								
3534.0	$\langle 3,4 \rangle$												100
3551(3)	2 ⁺ , 3 ⁻				72Mu09								
3602													
3620.9(7)	8 ⁺									x			
3643.8(6)	1 ⁻				06Vo0A	x							
3653(3)	2 ⁺ , 3 ⁻				77Sh06								
3661.2	$\langle 7,8 \rangle$												
3710(4)	5 ⁻				71Jo16								
3715.3(9)	10 ⁺			23.1(4) ns									
3729(2)	2 ⁺				77Sh06								
3746(2)					72Mu09								
3780	$\langle 3^+, 4^+ \rangle$				71Jo16								
3792(4)	3 ⁻				77Sh06								
3895.3(1)	9 ⁺												
3911(10)	4 ⁺ , 5 ⁻				71Jo16								
3912(4)	2 ⁻												
3956(4)													
3970.8(10)													x
3980	3 ⁻				77Sh06								
4000(4)	4 ⁻												
4017(10)					71Jo16								
4053	1				06Vo0A								

(continued)

¹⁴⁰Ce
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E^*	J^π	σ (d, ⁶ Li)	γ_α^2	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		$\mu\text{b/sr}$	[keV]	Γ_{cm}		E_{f}^* : J_{f}^π :	0.0 0 ⁺	1596 2 ⁺	1903 0 ⁺	2083 4 ⁺	2108 6 ⁺	2348 2 ⁺	2350 5 ⁺
4125(10)	2 ⁺				71Jo16								
4158(4)	2 ⁻												
4170(2)					71Jo16								
4173.6(8)	1				06Vo0A								
4183(10)	2 ⁺				77Sh06								
4208(6)													
4242(10)	2 ⁺ ,1 ⁻				71Jo16								
4263.5(11)	10 ⁺												
4296(6)	3 ⁻ ,4 ⁺				77Sh06								
4331	1				06Vo0A								
4354.9(7)	1				06Vo0A								
4360(10)	X ⁺				71Jo16								
4364(4)	1 ⁻												
4371	1				06Vo0A								
4388	1				06Vo0A								
4424(4)	2 ⁺ ,3 ⁻				77Sh06								
4437	1				06Vo0A								
4449.5(13)	⟨9,11⟩												
4450(10)													
4485(10)													
4514.9(9)	1				06Vo0A								
4538(4)	3 ⁻				77Sh06								
4571.3(13)	⟨8 ⁺ ,10 ⁺ ⟩												
4580(4)	2 ⁻												
4640(10)													
4655	1												
4700(10)													
4720(15)													
4748(4)	2 ⁻												
4760(15)													
4770(10)	1 ⁻												
4787.8(9)	1				06Vo0A								
4827(10)	2 ⁺ ,3 ⁻				77Sh06								
4852.3(11)	12 ⁺												
4860(10)													
4875	1				06Vo0A								
4883	1				06Vo0A								
4905.3(12)	11 ⁻												
4910(15)													
4951	1				06Vo0A								
4958.9(10)	⟨11 ⁺ ⟩												
4979(10)	2 ⁺ ,3 ⁻				77Sh06								
5000(15)													
5026(6)	2 ⁻ ,3 ⁻												
5050(15)													

(continued)

¹⁴⁰Ce
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E^*	J^π	σ (d, ^6Li)	γ_α^2	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		$\mu\text{b/sr}$	[keV]	Γ_{cm}		E_{f}^* : J_{f}^π :	0.0 0 $^+$	1596 2 $^+$	1903 0 $^+$	2083 4 $^+$	2108 6 $^+$	2348 2 $^+$	2350 5 $^+$
5070.5(13)	$\langle 9, 11 \rangle$												
5094.1(12)	$\langle 12^- \rangle$												
5101(10)	≥ 5				77Sh06								
5103.6(13)	13^-												
5140(15)													
5157.3(12)	1				06Vo0A								
5190.2(10)	1				06Vo0A								
5196(6)	$2^-, 3^-$												
5211.6(14)	1				06Vo0A								
5230(15)					77Sh06								
5245	1				06Vo0A								
5295(10)	$5^-, 6^+$				77Sh06								
5330	1				06Vo0A								
5336.2(13)	$\langle 12^- \rangle$												
5337.3(9)	1				06Vo0A								
5377(10)	$4^+, 5^-$				77Sh06								
5424(6)	$2^-, 3^-$												
5449(10)													
5466(6)	$2^-, 3^-$												
5470	1				06Vo0A								
5494	1				06Vo0A								
5548.4(7)	1				06Vo0A								
5573.8(14)	1				06Vo0A								
5574(15)	$\langle 0^+ \rangle$				77Sh06								
5650(15)	$2^+, 3^-$				77Sh06								
5624	1				06Vo0A								
5659.9(6)**	1^-			13(3) meV	06Vo0A		x						
5703(15)	$1^-, 2^+$				77Sh06								
5721	1				06Vo0A								
5759	1				06Vo0A								
5789(15)					77Sh06								
5809	1				06Vo0A								
5823	1				06Vo0A								
5896(15)	$1^-, 2^+$				77Sh06								
5928.6(10)	1				06Vo0A								
5940	1				06Vo0A								
5989(15)	$\langle 3^-, 4^+ \rangle$				77Sh06								
6029	1				06Vo0A								
6078(15)	$2^+, 3^-$				77Sh06								
6119.1(15)	1				06Vo0A								
6130.6(12)	1				06Vo0A								
6161.7(14)	1				06Vo0A								
6187(15)	$2^+, 3^-$				77Sh06								
6226	1				06Vo0A								
6245	1				06Vo0A								

(continued)

¹⁴⁰Ce
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E^*	J^π	σ (d, ⁶ Li)	γ_α^2	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		$\mu\text{b/sr}$	[keV]	Γ_{cm}		E_{f}^* :	0.0	1596	1903	2083	2108	2348	2350
						J_{f}^π :	0 ⁺	2 ⁺	0 ⁺	4 ⁺	6 ⁺	2 ⁺	5 ⁺
6255	1				06Vo0A								
6268(15)					77Sh06								
6273.6(10)	1				06Vo0A								
6295.3(8)	1				06Vo0A								
6327.8(12)	1				06Vo0A								
6343.3(11)	1				06Vo0A								
6752.7(10)	1				06Vo0A								
6364(15)	3 [−] ,4 ⁺				77Sh06								
6397.2(8)	1				06Vo0A								
6439.9(14)	1				06Vo0A								
6449.9(15)	1				06Vo0A								
6458.5(15)	1				06Vo0A								
6484.8(10)	1				06Vo0A								
6497.0(7)	1				06Vo0A								
6535.8(6)	1				06Vo0A								
6549.1(11)	1				06Vo0A								
6574.9(15)	1				06Vo0A								
6605.5(10)	1				06Vo0A								
6616.2(10)	1				06Vo0A								
6678													
6781.9(15)	1				06Vo0A								
6841.8(12)	1				06Vo0A								
6862.4(7)	1				06Vo0A								
6905.9(15)	1				06Vo0A								
6932.6(14)	1				06Vo0A								
6960.4(12)	1				06Vo0A								
7050													
7206.0(14)	1				06Vo0A								
7214.8(15)	1				06Vo0A								
7341.5(14)	1				06Vo0A								
7370	0 ⁺												
7673.4(12)	1				06Vo0A								
					Ref.								
					Ref.								

Energy levels and branching ratios [94Pe19]. Part 3

¹⁴⁰Ce
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E^*	J^π	Branching ratios in percentage									
		E_f^* :	2412	2480.9	2515.8	2628.9	3424.6	3476.9	3493.0	3512.9	3620.9
[keV]		J_f^π :	3 ⁺	4 ⁺	3 ⁺ ,4 ⁺	6 ⁺	7 [−]	8 [−]	9 [−]	8 ⁺	8 ⁺
2480.92(3)	4 ⁺		13.4(10)								
2521.43(3)	2 ⁺		1.70(9)								

(continued)

¹⁴⁰Ce
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E^* [keV]	J^π	Branching ratios in percentage									
		$E_f^*:$ $J_f^\pi:$	2412 3 ⁺	2480.9 4 ⁺	2515.8 3 ⁺ ,4 ⁺	2628.9 6 ⁺	3424.6 7 ⁻	3476.9 8 ⁻	3493.0 9 ⁻	3512.9 8 ⁺	3620.9 8 ⁺
3255.8(7)	5 ⁻			x	x						
3394.68(9)	⟨4 ⁻ ⟩		36								
3395.1(10)	⟨4 ⁺ ⟩		100								
3473.6(2)	3 ⁻			17(6)							
3476.9(7)	8 ⁻					x	x				
3493.0(7)	9 ⁻						x	x			
3522.4	⟨5⟩			x							
3620.9(7)	8 ⁺					x					
3661.2	⟨7,8⟩					x					
3715.3(9)	10 ⁺								70(18)	30(6)	
3895.3(1)	9 ⁺									x	x
4571.3(13)	⟨8 ⁺ ,10 ⁺ ⟩									x	
4958.9(10)	⟨11 ⁺ ⟩								100		

Energy levels and branching ratios [94Pe19]. Part 4

¹⁴⁰Ce
58

E^* [keV]	J^π	Branching ratios in percentage							
		$E_f^*:$ $J_f^\pi:$	3715.3 10 ⁺	3895.3 9 ⁺	4263.5 10 ⁺	4852.3 12 ⁺	4905.3 11 ⁻	4958.9 ⟨11 ⁺ ⟩	5103.6 13 ⁻
3895.3(1)	9 ⁺		x						
4263.5(11)	10 ⁺		x	x					
4449.5(13)	⟨9,11⟩		x						
4852.3(11)	12 ⁺		x		x				
4905.3(12)	11 ⁻		100						
5070.5(13)	⟨9,11⟩		100						
5094.1(12)	⟨12 ⁻ ⟩						x	x	
5103.6(13)	13 ⁻					x			
5336.2(13)	⟨12 ⁻ ⟩							x	x

Energy levels and branching ratios [01Tu02].

¹⁴¹Ce
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E^*	$2J^\pi$	L	S_{dp}	S'	σ (d,p)	S'	S_{dp}	L	L	S_N	L	S_N	σ (d,t)	σ (τ,α)	Ref.
[keV]				(d,p)	$\mu\text{b/sr}$	(d,p)		(p,d)	(d,t)	(d,t)		(τ,α)	$\mu\text{b/sr}$	$\mu\text{b/sr}$	
0.0	7 ⁻	3	0.79	6.34	5690	6.14	0.89	⟨3⟩	3	0.91	3	0.83	2580	39	77Pa03
662.06(5)	3 ⁻	1	0.42	1.68	4480	1.84	0.42	⟨1⟩	1	0.18			2000		77Pa03
1137.0(3)	1 ⁻	1	0.37	0.73		0.78		⟨1⟩	1	0.06			510		77Pa03
1354.52(9)	9 ⁻	5	0.70	7.0		5.26									77Pa03
1368.7(2)	13 ⁺	6	0.64	9.0		5.39	1.20		6	0.2	6	<0.4	27	61	77Pa03

(continued)

¹⁴¹Ce
₅₈

E^*	$2J^\pi$	L	S_{dp}	S'	σ (d,p)	S'	S_{dp}	L	L	S_N	L	S_N	σ (d,t)	σ (τ,α)	Ref.
[keV]				(d,p)	$\mu\text{b/sr}$	(d,p)		(p,d)	(d,t)	(d,t)		(τ, α)	$\mu\text{b/sr}$	$\mu\text{b/sr}$	
1378(2)	$9^-, 11^-$	$\langle 5 \rangle$					incl	$\langle 5 \rangle$	$\langle 5 \rangle$	0.4			83		77Pa03
1497.0(1)	5^-	3	0.27	1.60		1.42	0.30		3	0.11			140		77Pa03
1626.5(9)	$\langle 3 \rangle^+$							2	2	2.2	2	2.3	3810	54	79Li12
1693.3(1)	11^-	5	0.29	2.91		2.17									77Pa03
1739.0(1)	7^-	3		0.92		0.98	0.38		3	0.018			31		77Pa03
1785(3)	1^+							0	0	1.0	0	0.45	7000	15	79Li12
1808.7(4)	3^-	1		0.23		0.38									77Pa03
1812(2)	5^-	3		0.92		0.71									77Pa03
1915(3)	$11^-, 9^-$								5	0.86	5	0.69	124	82	79Li12
1942(3)	1^+								0	0.08			410		79Li12
1943.9(3)															
1962.5	$15^{\langle + \rangle}$														
1994.0(5)	$\langle 1^- \rangle$	1		0.07		0.9									77Pa03
2030.2(2)															
2044(10)	$11^-, 9^-$										5	0.46		55	79Li12
2049.2(3)															
2113(2)	$\langle 5 \rangle^-$	3		0.58		0.61									77Pa03
2165(5)	$11^-, 9^-$	1		0.09		0.40			5	2.1	5	1.7	310	195	77Pa03
2166(2)	3^-														
2171.1(3)	9^-		0.04	0.36											
2174.0(3)	5^-							5							
2189(2)	$\langle 5^-, 7^- \rangle$	$\langle 3 \rangle$		0.25											77Pa03
2189.6(5)	3^-	$\langle 1 \rangle$		0.09		0.29									77Pa03
2207.4(2)	$\langle 7^+ \rangle$								$\langle 4 \rangle$	0.4			63		79Li12
2209	$17^{\langle + \rangle}$														
2243(10)	$\langle 7^+, 9^+ \rangle$										$\langle 4 \rangle$	0.06		18	79Li12
2263(2)	$\langle 7^+, 9^+ \rangle$	$\langle 4 \rangle$		0.12											77Pa03
2266.9(2)	$\langle 5^+ \rangle$														
2274	$\langle 19 \rangle$														
2292(2)	$X^{\langle + \rangle}$	$\langle 2+4 \rangle$		0.06											77Pa03
2328.9(11)	7^-	3		0.42		0.19					$\langle 3 \rangle$	0.03		7	77Pa03
2336.3(8)	3^-	1		incl		0.27									77Pa03
2403(5)	$3^+, 5^+$								2	0.05			81		79Li12
2404(2)	$\langle 5^- \rangle$	3													
2410.8(6)	1^-	1		0.45		0.49									77Pa03
2425.6(8)	3^-	1		0.45		0.18									77Pa03
2450		$\langle 3 \rangle$		0.18		0.52									77Pa03
≈ 2450	$\langle 5^-, 7^- \rangle$														
2458(5)	$3^+, 5^+$							2	2	0.27	2	0.28	390	10	79Li12
≈ 2507	$\langle 3^+, 5^+ \rangle$	$\langle 2 \rangle$		0.03											77Pa03
2522.9(6)	$1^-, 3^-$	1		0.14											77Pa03
2531(10)	$9^-, 11^-$										$\langle 5 \rangle$	0.06		7	79Li12
2543(5)													17		
2555(2)															
2583(10)														8	

(continued)

¹⁴¹Ce
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E^*	$2J^\pi$	L	S_{dp}	S'	σ (d,p)	S'	S_{dp}	L	L	S_N	L	S_N	σ (d,t)	σ (τ,α)	Ref.
[keV]				(d,p)	$\mu\text{b/sr}$	(d,p)		(p,d)	(d,t)	(d,t)		(τ,α)	$\mu\text{b/sr}$	$\mu\text{b/sr}$	
2611(2)	$\langle 1^-, 3^- \rangle$	$\langle 1 \rangle$		0.07											77Pa03
2634(2)	$5^-, 7^-$	3		0.16											77Pa03
2649(5)	$3^+, 5^+$								2	0.05			31		79Li12
2671(10)														8	
2800								$\langle 5 \rangle$							
2841(5)	1^+								0	0.014			65		79Li12
2886(5)	$3^+, 5^+$					3.15			2	0.15	2		155	9	79Li12
2899	$\langle 3^+, 5^+ \rangle$	$\langle 2 \rangle$		0.03		incl									77Pa03
2899(2)	$13^+, 11^+$	$\langle 6 \rangle$	0.14	2.1		incl									77Pa03
2987(7)	1^+								0	0.27	0		1080	20	79Li12
3012(3)															
3055(7)	$3^+, 5^+$								2	0.89	2	1.4	885	95	79Li12
3070(3)	$5^-, 7^-$	3		0.14		0.13									77Pa03
3070(3)	$1^-, 3^-$	1		0.08		0.05									77Pa03
3071(7)	$3^+, 5^+$								2	0.43			410		79Li12
3109(3)															
3114(7)	$11^-, 9^-$								5	0.75	5	0.82	79	98	79Li12
3159(3)	$\langle 1^-, 3^- \rangle$	$\langle 1 \rangle$		0.05											77Pa03
3175(3)															
3203(3)															
3210(7)	$3^+, 5^+$								2	0.07			59		79Li12
3235(3)															
3265(3)		$\langle 1+3 \rangle$		0.17		0.32									77Pa03
3297(3)	$\langle 1^-, 3^- \rangle$	$\langle 1 \rangle$		0.08											77Pa03
3319(3)				0.10											
3333(10)	$5^-, 7^-$										3	0.30		37	79Li12
3351(3)	1^+	0	0.02	0.03		0.08									77Pa03
3351(3)	$\langle 3^+, 5^+ \rangle$	$\langle 2 \rangle$		0.14		0.26									77Pa03
3408(3)	$\langle 3^+, 5^+ \rangle$	$\langle 2 \rangle$		0.03											77Pa03
3409(10)	$11^-, 9^-$										$\langle 5 \rangle$	0.18		23	79Li12
3413(9)	1^+								0	0.046			143		79Li12
3449(3)															
3486(3)	$\langle 5^-, 7^- \rangle$	$\langle 3 \rangle$		0.07											77Pa03
3523(3)	$\langle 7^+, 9^+ \rangle$	$\langle 4 \rangle$		0.34											77Pa03
3578(3)	$\langle 7^+, 9^+ \rangle$	$\langle 4 \rangle$		0.29											77Pa03
3609(9)	$\langle 9^+, 7^+ \rangle$										$\langle 4 \rangle$		113	24	79Li12
3673(3)	$\langle 3^+, 5^+ \rangle$	$\langle 2 \rangle$		0.06				$\langle 2 \rangle$	0.06				52		77Pa03
3684(3)	$\langle 7^+, 9^+ \rangle$	$\langle 4 \rangle$		0.42									65		77Pa03
3704(9)													54		79Li12
			77Pa03	77Pa03			67Wi08	72Pi		79Li12		79Li12	79Li12	79Li12	Ref.
						75Bo03									Ref.

Additional data on this isotope can be found in [77St33, 77Cl02, 75Cl05, 71Cl08].

Data for this isotope are considered in vol. LB I/18B.

Energy levels and branching ratios [01Tu02]. Part 2

¹⁴¹Ce
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E^*	$2J^\pi$	S'	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		(d,p)	Γ_{cm}		E_f^* : $2J_f^\pi$:	0.0 7 ⁻	662 3 ⁻	1137 1 ⁻	1354 9 ⁻	1369 13 ⁺	1378	1497 5 ⁻
0.0	7 ⁻		32.51(1) d	77Pa03								
662.06(5)	3 ⁻			77Pa03		100						
1137.0(3)	1 ⁻			77Pa03			100					
1354.52(9)	9 ⁻			77Pa03		100						
1368.7(2)	13 ⁺	5.4	5.3(3) ns	77Pa03		100						
1378(2)	9 ⁻ , 11 ⁻			77Pa03		100						
1497.0(1)	5 ⁻			77Pa03		90(5)	10(4)					
1626.5(9)	⟨3⟩ ⁺			79Li12			100					
1693.3(1)	11 ⁻			77Pa03		98(6)				1.8(7)		
1739.0(1)	7 ⁻			77Pa03		100						
1785(3)	1 ⁺			79Li12								
1808.7(4)	3 ⁻			77Pa03		29(8)	48(8)	23(7)				
1812(2)	5 ⁻			77Pa03		94(13)	6(2)					
1915(3)	11 ⁻ , 9 ⁻			79Li12								
1942(3)	1 ⁺			79Li12								
1943.9(3)						77(12)			23(12)			
1962.5	15 ^{⟨+⟩}									x		
1994.0(5)	⟨1 ⁻ ⟩			77Pa03			100					
2030.2(2)						100						
2044(10)	11 ⁻ , 9 ⁻			79Li12								
2049.2(3)						67(11)			33(21)			
2113(2)	⟨5⟩ ⁻			77Pa03		89(7)	11(1)					
2165(5)	11 ⁻ , 9 ⁻			77Pa03								
2166(2)	3 ⁻					65(12)	20(14)				15(18)	
2171.1(3)	9 ⁻					100						
2174.0(3)	5 ⁻											
2189(2)	⟨5 ⁻ , 7 ⁻ ⟩			77Pa03								
2189.6(5)	3 ⁻			77Pa03			44(10)	56(12)				x
2207.4(2)	⟨7 ⁺ ⟩			79Li12		51(4)			21(4)			21(4)
2209	17 ^{⟨+⟩}											
2243(10)	⟨7 ⁺ , 9 ⁺ ⟩			79Li12								
2263(2)	⟨7 ⁺ , 9 ⁺ ⟩			77Pa03								
2266.9(2)	⟨5 ⁺ ⟩					83(5)	17(2)					
2274	⟨19⟩		2.2(4) ns									
2292(2)	X ^{⟨+⟩}			77Pa03								
2328.9(11)	7 ⁻			77Pa03		100						
2336.3(8)	3 ⁻			77Pa03			x	x				x
2403(5)	3 ⁺ , 5 ⁺			79Li12								
2404(2)	⟨5 ⁻ ⟩					[33]		[6]				[53]
2410.8(6)	1 ⁻			77Pa03			85(13)	8(5)				
2425.6(8)	3 ⁻			77Pa03			17(4)	72(7)				
2450				77Pa03								
≈2450	⟨5 ⁻ , 7 ⁻ ⟩											
2458(5)	3 ⁺ , 5 ⁺			79Li12								
≈2507	⟨3 ⁺ , 5 ⁺ ⟩			77Pa03								

(continued)

¹⁴¹Ce
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E^*	$2J^\pi$	S'	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		(d,p)	Γ_{cm}		E_{f}^* : $2J_{\text{f}}^\pi$:	0.0 7 ⁻	662 3 ⁻	1137 1 ⁻	1354 9 ⁻	1369 13 ⁺	1378	1497 5 ⁻
2522.9(6)	1 ⁻ ,3 ⁻			77Pa03				100				
2531(10)	9 ⁻ ,11 ⁻			79Li12								
2543(5)												
2555(2)												
2583(10)												
2611(2)	⟨1 ⁻ ,3 ⁻ ⟩			77Pa03								
2634(2)	5 ⁻ ,7 ⁻			77Pa03								
2649(5)	3 ⁺ ,5 ⁺			79Li12								
2671(10)												
2800												
2841(5)	1 ⁺			79Li12								
2886(5)	3 ⁺ ,5 ⁺			79Li12								
2899	⟨3 ⁺ ,5 ⁺ ⟩			77Pa03								
2899(2)	13 ⁺ ,11 ⁺	3.2		77Pa03								
2987(7)	1 ⁺			79Li12								
3012(3)												
3055(7)	3 ⁺ ,5 ⁺			79Li12								
3070(3)	5 ⁻ ,7 ⁻			77Pa03								
3070(3)	1 ⁻ ,3 ⁻			77Pa03								
3071(7)	3 ⁺ ,5 ⁺			79Li12								
3109(3)												
3114(7)	11 ⁻ ,9 ⁻			79Li12								
3159(3)	⟨1 ⁻ ,3 ⁻ ⟩			77Pa03								
3175(3)												
3203(3)												
3210(7)	3 ⁺ ,5 ⁺			79Li12								
3235(3)												
3265(3)				77Pa03								
3297(3)	⟨1 ⁻ ,3 ⁻ ⟩			77Pa03								
3319(3)												
3333(10)	5 ⁻ ,7 ⁻			79Li12								
3351(3)	1 ⁺			77Pa03								
3351(3)	⟨3 ⁺ ,5 ⁺ ⟩			77Pa03								
3408(3)	⟨3 ⁺ ,5 ⁺ ⟩			77Pa03								
3409(10)	11 ⁻ ,9 ⁻			79Li12								
3413(9)	1 ⁺			79Li12								
3449(3)												
3486(3)	⟨5 ⁻ ,7 ⁻ ⟩			77Pa03								
3523(3)	⟨7 ⁺ ,9 ⁺ ⟩			77Pa03								
3578(3)	⟨7 ⁺ ,9 ⁺ ⟩			77Pa03								
3609(9)	⟨9 ⁺ ,7 ⁺ ⟩			79Li12								
3673(3)	⟨3 ⁺ ,5 ⁺ ⟩			77Pa03								
3684(3)	⟨7 ⁺ ,9 ⁺ ⟩			77Pa03								
3704(9)				79Li12								

(continued)

¹⁴¹₅₈Ce

E^*	$2J^\pi$	S'	$T_{1/2}$ or	Ref.	Branching ratios in percentage							
[keV]		(d,p)	Γ_{cm}		$E_f^*:$ $2J_f^\pi:$	0.0 7 ⁻	662 3 ⁻	1137 1 ⁻	1354 9 ⁻	1369 13 ⁺	1378	1497 5 ⁻
		74Bo32		Ref. Ref.								

Energy levels and branching ratios [01Tu02]. Part 3

¹⁴¹₅₈Ce

E^*	$2J^\pi$	Branching ratios in percentage					
[keV]		$E_f^*:$ $2J_f^\pi:$	1626 $\langle 3 \rangle^+$	1808.7 3 ⁻	1812 5 ⁻	1962.5 15 ⁽⁺⁾	2209 17 ⁽⁺⁾
2207.4(2)	$\langle 7^+ \rangle$		8(3)				
2209	17 ⁽⁺⁾					x	
2274	$\langle 19 \rangle$						100
2404(2)	$\langle 5^- \rangle$				[7]		
2410.8(6)	1 ⁻			8(8)			
2425.6(8)	3 ⁻			12(2)			

Energy levels and branching ratios [00Tu01].

¹⁴²₅₈Ce

E^*	J^π	L	σ (t,p)	I_γ	Γ	$B(M1)$	S_α	σ (d, ⁶ Li)	γ_α^2	$T_{1/2}$ or	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$	[eVb]	[meV]	$[\mu_N^2]$	(d, ⁶ Li)	$\mu\text{b/sr}$	[keV]	Γ_{cm}	
0.0	0 ⁺	0	340				0.075	6.11(51)	1.19	$>5 \cdot 10^{16}$ yr	72Mu09
641.282(9)	2 ⁺	2	600				0.013	0.59(16)	0.14	5.56(12) ps	72Mu09
1219.39(3)	4 ⁺		431							7.5(7) ps	72Mu09
1536.28(4)	2 ⁺									<0.83 ps	
1652.91(4)	3 ⁻	3	162							>1.8 ps	72Mu09
1742.0(8)	$\langle 4^+ \rangle$										
1742(3)	5 ⁻		133								72Mu09
1743.02(6)	6 ⁺										
2004.89(7)	2 ⁺	2	240							0.045(+5-4) ps	72Mu09
2014.5(3)											
2031.00(9)	0 ⁺									0.17(+15-6) ps	
2044.49(6)	4 ⁺		40							0.33(+11-7) ps	72Mu09
2112.05(7)	4 ⁺		45							0.37(+30-12) ps	72Mu09
2124.90(8)	5 ⁻		155							>0.41 ps	72Mu09
2181.90(5)	3 ⁺									0.26(+55-11) ps	
2187.44(11)	1 ⁻		50	59(2)	39.8(1)	3.62(12)*				0.011(2) ps	72Mu09
2210.58(6)	6 ⁺										
2278.11(8)	4 ⁺		46							0.083(+49-28) ps	72Mu09
2329.85(10)	3 ⁺									0.21(+21-8) ps	

(continued)

¹⁴²Ce
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E^*	J^π	L	σ (t,p)	I_γ	Γ	$B(M1)$	S_α	σ (d, ⁶ Li)	γ_α^2	$T_{1/2}$ or	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$	[eVb]	[meV]	$[\mu_N^2]$	(d, ⁶ Li)	$\mu\text{b/sr}$	[keV]	Γ_{cm}	
2364.91(12)	2 ⁺		25							0.016(+3-2) ps	72Mu09
2374.96(8)	X ⁺									>0.69 ps	
2384.43(7)	4 ⁻									0.060(+76-28) ps	
2398.40(7)	1 ⁺			12.0(5)	7.4(4)	0.047(3)				0.076(+21-14) ps	
2540.12(8)	4 ⁺									0.041(+18-12) ps	
2542.72(17)	1		44							<0.014 ps	72Mu09
2543.21(8)	2 ⁺		incl							0.21(+25-8) ps	72Mu09
2570.26(8)	5 ⁺									0.12(+18-6) ps	
2576.14(6)	3 ⁺									>0.69 ps	
2591.0(3)											
2598.24(10)	2 ⁺									>1.66 ps	
2602.55(6)	$\langle 3,2 \rangle^+$		102							0.24(+25-8) ps	72Mu09
2606.50(8)	4 ⁺									0.049(+83-28) ps	
2666.9(3)	1 ⁺									0.054(+24-15) ps	
2680.50(20)	$\langle 2-4 \rangle^+$									0.2(1) ps	
2697.00(7)	2 ⁺									0.08(+6-3) ps	
2698.6(1)	4 ⁺		92							0.076(+21-15) ps	72Mu09
2715.13(7)	3 ⁺									0.12(+13-5) ps	
2725.7(1)	5 ⁺									0.05(2) ps	
2727.86(6)	2 ^{$\langle - \rangle$}									0.27(+29-8) ps	
2734.77(8)	$\langle 3,2 \rangle$		113							>0.37 ps	72Mu09
2741.97(9)	$\langle 2,3 \rangle^+$									0.08(2) ps	
2767.84(8)	$\langle 1-3 \rangle^+$									0.06(2) ps	
2773.76(8)	$\langle 3 \rangle^+$		9							>0.69 ps	72Mu09
2784.8(2)	$\langle 3-5 \rangle$									0.23(+63-10) ps	
2792.9(3)											
2800.75(9)	1 ^{$\langle + \rangle$}			36.8(13)	29.9(12)	0.118(7)				0.010(2) ps	
2806.39(9)	3 ⁺		38							0.10(+7-3) ps	72Mu09
2842.6(1)	$\langle 2,3 \rangle^+$									0.04(1) ps	
2853.3(1)	2 ⁺									0.076(+42-21) ps	
2859.7(1)	4		102							>0.69 ps	72Mu09
2869.08(9)	$\langle 4 \rangle^+$									>0.46 ps	
2887.7(2)	3 ⁺									0.041(+12-9) ps	
2922(4)			96								72Mu09
2934.5(2)	$\langle 2-4 \rangle$									>0.48 ps	
2956.4(2)	3 ⁺									0.017(+7-6) ps	
2986(5)			26								72Mu09
2999.0(2)	1 ⁺		22	5.8(3)	11.9(9)	0.038(5)				0.017(+13-8) ps	72Mu09
3009.9(2)										>0.69 ps	
3011.93(20)	1			28.4(10)	22.4(8)	0.071(3)				0.016(+6-4) ps	04Ga25
3042.30(15)										0.18(+34-8) ps	
3051.79(9)	$\langle 3 \rangle^+$									>0.69 ps	
3060.97(9)	X ⁺									0.09(+11-4) ps	
3067(4)			26								72Mu09
3089.93(15)	$\langle 2,3 \rangle^+$									0.058(+29-17) ps	

(continued)

¹⁴²Ce
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E^*	J^π	L	σ (t,p)	I_γ	Γ	$B(M1)$	S_α	σ (d, ⁶ Li)	γ_α^2	$T_{1/2}$ or	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$	[eVb]	[meV]	$[\mu_N^2]$	(d, ⁶ Li)	$\mu\text{b/sr}$	[keV]	Γ_{cm}	
3101.85(24)											
3106.05(15)	3 ⁺									0.053(+26-15) ps	
3109.80(15)										>0.69 ps	
3122.4(4)											
3125.71(20)	$\langle 1-3 \rangle$									>0.65 ps	
3144.55(15)	3 ⁺										
3153.75(14)	2 ⁺									0.11(+15-5) ps	
3155.35(15)										>0.69 ps	
3164.7(5)			29								72Mu09
3180.49(17)	1									>0.69 ps	
3208.96(15)	3 ⁺									0.043(+41-18) ps	
3218.21(20)										>0.69 ps	
3228.64(10)	$\langle 5^- \rangle$		75								72Mu09
3300.69(21)										>0.69 ps	
3304.5(6)	2 ⁺										
3313.76(20)	1			24.5(9)	28.3(13)	0.067(3)					04Ga25
3400.9	1			33.4(12)	33.6(12)	0.074(3)					04Ga25
3420.14(23)	1 ⁻ , 2 ⁻										
3423.59(22)											
3436(4)			21								72Mu09
3459.88(21)											
3470.26(24)											
3515.1	1			2.9(3)	6.7(10)	0.013(3)					04Ga25
3612.4(3)	2 ⁺		34								72Mu09
3633.34(22)	1			10.8(7)	12.3(7)	0.022(2)					04Ga25
3643.4	1			25.6(11)	29.5(12)	0.053(2)					04Ga25
3648.5(4)											
3675.8(5)	1 ⁺										
3688.9(4)											
3703.8(3)											
3717.80(22)	1 ⁺			9.4(7)	11.2(8)	0.019(1)					04Ga25
3719.2(4)											
3732(4)			76								72Mu09
3745.7	1			10.0(8)	12.2(9)	0.020(1)					04Ga25
3776.6	1			11.0(8)	13.6(10)	0.022(1)					04Ga25
3851.1(6)	1			15.7(12)	20.3(16)	0.031(3)					04Ga25
3884.2(5)											
3914.4(5)											
3975.93(17)											
4043.3(4)	2 ⁺										

(continued)

¹⁴²Ce
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E^*	J^π	L	σ (t,p)	I_γ	Γ	$B(M1)$	S_α	σ (d, ⁶ Li)	γ_α^2	$T_{1/2}$ or	Ref.
[keV]		(t,p)	$\mu\text{b/sr}$	[eVb]	[meV]	$[\mu_N^2]$	(d, ⁶ Li)	$\mu\text{b/sr}$	[keV]	Γ_{cm}	
4045.6(4)		72Mu09	72Mu09	04Ga25	04Ga25	04Ga25					Ref.

Additional data on this isotope can be found in [02Li21, 01Ch03, 95Va25, 92Al11].

Abundance: 11.114(17) %.* $B(E1)$ in units $10^{-3}e^2fm^2$ instead of $B(M1)$ for all other levels (suggesting $J^\pi = 1^+$).

Data for this isotope are considered in vol. LB I/18B.

Energy levels and branching ratios [00Tu01]. Part 2

¹⁴²Ce
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E^*	J^π	Branching ratios in percentage									
		E_f^* :	0.0	641	1219	1536	1653	1743	2005	2014	2031.00
[keV]		J_f^π :	0 ⁺	2 ⁺	4 ⁺	2 ⁺	3 ⁻	6 ⁺	2 ⁺		0 ⁺
641.282(9)	2 ⁺		100								
1219.39(3)	4 ⁺			100(4)							
1536.28(4)	2 ⁺		1.0	99.0							
1652.91(4)	3 ⁻			87	13						
1742.0(8)	$\langle 4^+ \rangle$			100							
1743.02(6)	6 ⁺				100						
2004.89(7)	2 ⁺		28	70			2				
2014.5(3)			66.7	33(3)							
2031.00(9)	0 ⁺			100							
2044.49(6)	4 ⁺			97	3						
2112.05(7)	4 ⁺				100						
2124.90(8)	5 ⁻				81		10	9			
2181.90(5)	3 ⁺			38.6	45.5	11.9	4.0				
2187.44(11)	1 ⁻		58.6	41.41			<0.30				
2210.58(6)	6 ⁺				17			83			
2278.11(8)	4 ⁺			71.0	29.00						
2329.85(10)	3 ⁺			70		30					
2364.91(12)	2 ⁺		24	76						<2	
2374.96(8)	X ⁺				52			48			
2384.43(7)	4 ⁻				16		79				
2398.40(7)	1 ⁺		76.6	13.74		7.86			1.1		0.8
2540.12(8)	4 ⁺			14	18						
2542.72(17)	1		100								
2543.21(8)	2 ⁺		45.0	30.3	23	1.1			0.2		
2570.26(8)	5 ⁺				87			13			
2576.14(6)	3 ⁺					25	12				
2591.0(3)			27(3)	73(9)							
2598.24(10)	2 ⁺		46			54					
2602.55(6)	$\langle 3,2 \rangle^+$			70.8	15.6	<4.166					
2606.50(8)	4 ⁺			14.00	86.0						

(continued)

 $^{142}_{58}\text{Ce}$

E^* [keV]	J^π	Branching ratios in percentage								
		$E_f^*:$ $J_f^\pi:$	0.0 0 ⁺	641 2 ⁺	1219 4 ⁺	1536 2 ⁺	1653 3 ⁻	1743 6 ⁺	2005 2 ⁺	2014 2031.00 0 ⁺
2666.9(3)	1 ⁺		55(3)	30(2)		14(2)				
2680.50(20)	$\langle 2-4 \rangle^+$			100						
2697.00(7)	2 ⁺			30.05		25.36	38.5		1.3	
2698.6(1)	4 ⁺				100					
2715.13(7)	3 ⁺			30.00	50.0	20.00				
2725.7(1)	5 ⁺				68.0			32.00		
2727.86(6)	2 ⁽⁻⁾			42		47	11			
2734.77(8)	$\langle 3,2 \rangle$			23.8	38.6		13.9			
2741.97(9)	$\langle 2,3 \rangle^+$			75.3		3.5	21.2			
2767.84(8)	$\langle 1-3 \rangle^+$			61		22	17			
2773.76(8)	$\langle 3 \rangle^+$			52.0	17.00	15.00				
2784.8(2)	$\langle 3-5 \rangle$				100					
2792.9(3)				100						
2800.75(9)	1 ⁽⁺⁾		11.00	56.0		33.00				
2806.39(9)	3 ⁺			42.0	17.00	41.00				
2842.6(1)	$\langle 2,3 \rangle^+$			87.9	12.12				<1.0	
2853.3(1)	2 ⁺		36.00	64.0	<0.3000					
2859.7(1)	4				22.00		78.0			
2869.08(9)	$\langle 4 \rangle^+$			26.00	35.00		39.0			
2887.7(2)	3 ⁺			78.0	22.00					
2934.5(2)	$\langle 2-4 \rangle$			100		x				
2956.4(2)	3 ⁺			66.0	34.00					
2999.0(2)	1 ⁺		34.00	66.0						
3009.9(2)				100						
3011.93(20)	1		100							
3042.30(15)				46.00	54.0					
3051.79(9)	$\langle 3 \rangle^+$			11.54	22.11		66.3			
3060.97(9)	X ⁺		24	47.9		28.14				
3089.93(15)	$\langle 2,3 \rangle^+$			72.0						
3101.85(24)			23.08	77(8)						
3106.05(15)	3 ⁺			81.0	19.00					
3109.80(15)				30.00	70.0					
3122.4(4)			66.7						<16.67	33.33
3125.71(20)	$\langle 1-3 \rangle$			100						
3144.55(15)	3 ⁺			49.00		51.0				
3153.75(14)	2 ⁺		29	14		43				
3155.35(15)					50	50				
3164.7(5)			100	<50		<50				
3180.49(17)	1		27	36		23				
3208.96(15)	3 ⁺			84	16					
3218.21(20)				100						
3228.64(10)	$\langle 5^- \rangle$						x			
3300.69(21)						100				
3304.5(6)	2 ⁺			75(11)		25(5)				
3313.76(20)	1		74(4)	14.81						

(continued)

 $^{142}_{58}\text{Ce}$

E^* [keV]	J^π	Branching ratios in percentage									
		E^*_f : J^π_f :	0.0 0 ⁺	641 2 ⁺	1219 4 ⁺	1536 2 ⁺	1653 3 ⁻	1743 6 ⁺	2005 2 ⁺	2014	2031.00 0 ⁺
3423.59(22)				28.3		11(1)	16(4)				12.11
3459.88(21)			17.88	57(4)		14(4)			7.15		
3470.26(24)			13.33	40.0		20.00					
3612.4(3)	2 ⁺		17.9(10)	62(3)		16(2)					
3633.34(22)	1		60(3)	5.690		3(3)					
3648.5(4)				9.09		<4.545					
3675.8(5)	1 ⁺			44(4)		44(8)					
3688.9(4)				81.8							
3703.8(3)				9.09			45(9)				
3717.80(22)	1 ⁺			20.01		55(10)					
3719.2(4)			42.9								35.71
3851.1(6)	1		62.5	25.00					12(12)		
3884.2(5)				66.7		17(17)					
3914.4(5)				42.9		42.9					
3975.93(17)			<20.00	40.00						60.0	
4043.3(4)	2 ⁺			22.58					65(3)		
4045.6(4)			x								

Energy levels and branching ratios [00Tu01]. Part 3

 $^{142}_{58}\text{Ce}$

E^* [keV]	J^π	Branching ratios in percentage									
		E^*_f : J^π_f :	2044.49 4 ⁺	2112.05 4 ⁺	2181.90 3 ⁺	2187.44 1 ⁻	2278.11 4 ⁺	2364.91 2 ⁺	2398.40 1 ⁺	2542.72 1	2543.21 2 ⁺
2384.43(7)	4 ⁻				5						
2540.12(8)	4 ⁺				68						
2543.21(8)	2 ⁺					<0.2		0.9(2)			
2576.14(6)	3 ⁺	31			17		15				
2602.55(6)	⟨3,2⟩ ⁺	13.5									
2697.00(7)	2 ⁺				2(1)			1(1)			
2734.77(8)	⟨3,2⟩			23.76							
2773.76(8)	⟨3⟩ ⁺			16.00							
3051.79(9)	⟨3⟩ ⁺				x						
3089.93(15)	⟨2,3⟩ ⁺			28.00							
3420.14(23)	1 ⁻ , 2 ⁻					88.9(22)				8.89	
3423.59(22)					20.19			8.07			
3470.26(24)					<6.67	<6.67		6.67	13(7)		
3612.4(3)	2 ⁺								0.9(10)		1.9(10)
3633.34(22)	1					8.54					8.54
3648.5(4)						91(5)					
3675.8(5)	1 ⁺				12.00						
3703.8(3)						41(5)					
3717.80(22)	1 ⁺							10.00			

(continued)

¹⁴²Ce
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E^*	J^π	Branching ratios in percentage									
[keV]		E^*_f : J^π_f :	2044.49 4 ⁺	2112.05 4 ⁺	2181.90 3 ⁺	2187.44 1 ⁻	2278.11 4 ⁺	2364.91 2 ⁺	2398.40 1 ⁺	2542.72 1	2543.21 2 ⁺
3719.2(4)										21.43	
3975.93(17)					<20.00						
4043.3(4)	2 ⁺										6.45

Energy levels and branching ratios [00Tu01]. Part 4

¹⁴²Ce
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E^* [keV]	J^π	Branching ratios in percentage								
		$E_f^*:$ $J_f^\pi:$	2591.0	2666.9 1 ⁺	2697.00 2 ⁺	2725.74 5 ⁺	2727.86 2 ⁽⁻⁾	2741.97 (2,3) ⁺	2767.84	2792.9
2697.00(7)	2 ⁺		2.0							
3153.75(14)	2 ⁺									14
3180.49(17)	1					9		5		
3313.76(20)	1			11(7)					<3.704	
3423.59(22)								4(4)		
3459.88(21)				3(4)						
3470.26(24)										7(7)
3612.4(3)	2 ⁺				0.9(10)					
3688.9(4)								18.18		
3703.8(3)		5(5)								
3717.80(22)	1 ⁺				<5.003		10.00			
3914.4(5)										14.28
3975.93(17)					<20.00					
4045.6(4)					<100					

Energy levels and branching ratios [00Tu01]. Part 5

¹⁴²Ce
58

E^* [keV]	J^π	Branching ratios in percentage				
		$E_f^*:$ $J_f^\pi:$	3101.85	3313.76	3420.14 1 ⁻ , 2 ⁻	3459.88 3703.8
3420.14(23)	1 ⁻ , 2 ⁻		2.2(22)			
3633.34(22)	1		8.54			6(3)
3717.80(22)	1 ⁺				5(5)	
3884.2(5)				17(17)		
4043.3(4)	2 ⁺					6(3)
4045.6(4)						100

Energy levels and branching ratios [01Tu07].

 $^{143}_{58}\text{Ce}$

E^* [keV]	$2J^\pi$	L	C^2S (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage				
						E^*_f : $2J^\pi_f$:	0.0 3 ⁻	18.9 7 ⁻	42.28 5 ⁻	632.5 $\langle 1^- \rangle$
0.0	3 ⁻	1	0.13	33.039(6) h	72Le17					
18.9(1)	7 ⁻	3	4.00		72Le17					
42.28(7)	5 ⁻				02Ur04	x	x			
632.5(5)	$\langle 1^- \rangle$	$\langle 1 \rangle$	0.08		72Le17	100				
640.3(2)	$\langle 11^- \rangle$				02Ur04			100		
662.7(2)	9 ⁻	6	2.65		72Le17			40(2)	60(3)	
808.2(3)	3 ⁻	1	2.00		72Le17	35(3)		17(1)	49(2)	
817.0(2)	$\langle 9^- \rangle$				02Ur04			76(4)	24(2)	
862.1(3)	$\langle 1^- \rangle$	1	0.60		72Le17	100				
1095.3(2)								38(2)	50(3)	
1116.8(3)	$\langle 11^+ \rangle$				02Ur04					14(1)
1154.1(3)	3 ⁻	1	0.13		72Le17	80(2)	19			
1165.0(1)						24(2)	54(3)	22(1)		
1167.6(2)						8.2(8)	84(4)			8.0(8)
1172.5(3)	3 ⁻ , $\langle 1^- \rangle$	1	0.09		72Le17	57(9)			43(9)	
1195(10)	$\langle 5^- \rangle$	3	0.55		72Le17					
1220.0(4)	9 ⁻	5	4.40		72Le17			88(7)	12(2)	
1298(5)	$\langle 5^- \rangle$	3	0.73		72Le17					
1506(10)	5 ⁻ , 7 ⁻	3	0.13		72Le17					
1542(10)										
1558(10)	5 ⁻ , 7 ⁻	3	0.09		72Le17					
1572.4(5)	1 ⁻ , 3 ⁻	1	0.13		72Le17	88(10)			12(3)	
1598.7(8)									100	
1620.5(4)	3, $\langle 1^- \rangle$					33(8)			46(12)	21(4)
1628.7(4)	3, 1					69(19)			19(6)	
1635(5)	5 ⁻ , 7 ⁻	3	0.47		72Le17					
1676.9(3)								32(2)		
1714(10)	5 ⁻ , 7 ⁻	3	0.26		72Le17					
1726.7(2)								75(4)		9(1)
1739(10)	1 ⁻ , 3 ⁻	1	0.02		72Le17					
1810(10)	5 ⁻ , 7 ⁻	3	0.08		72Le17					
1835.2(8)	$\langle 1^- \rangle$	1	0.02		72Le17	27(7)				
1857.0(2)								69(5)		31(3)
1906.1(5)	$\langle 7^- \rangle$	3	0.17		72Le17					
1913.4(11)	$\langle 1^- \rangle$	1	0.07		72Le17	50(16)				
1945.4(6)	3 ⁻	1	0.05		72Le17			25(17)	75(25)	
1980.2(1)						20(1)	60(3)	20(1)		
1989.5(4)						46(8)				
1993.3(6)	$\langle 3^- \rangle$	1	0.09		72Le17	13(2)			74(7)	
2027.4(8)	$\langle 1^- \rangle$					57(11)				
2040(10)										
2057.0(4)										
2061.5(6)	3 ⁻	1	0.12		72Le17	22(5)	12(5)	54(10)		
2065.3(7)										
2112(10)										

(continued)

¹⁴³Ce
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E^* [keV]	$2J^\pi$	L	C^2S (d,p)	$T_{1/2}$ or Γ_{cm}	Ref.	Branching ratios in percentage					
						E_f^* : $2J_f^\pi$:	0.0 3 ⁻	18.9 7 ⁻	42.28 5 ⁻	632.5 ⟨1 ⁻ ⟩	640.3
2143(10)	1 ⁻ ,3 ⁻	1	0.07		72Le17						
2160(10)	1 ⁻ ,3 ⁻	1	0.07		72Le17						
2202.0(6)	1,3						100				
2215.9(6)	⟨3⟩ ⁻	1	0.09		72Le17				100		
2232.1(7)	⟨3⟩ ⁻	1	0.07		72Le17		20(10)		80(30)		
2255(10)	1 ⁻ ,3 ⁻	1	0.29		72Le17						
2255.3(4)											
2272.7(10)	1 ⁻ ,3						33(12)		33(17)		
2307.2(6)	⟨5 ⁻ ,7 ⁻ ⟩	3	0.36		72Le17						
2313.9(8)	3 ⁻ ,1 ⁻	1	0.05		72Le17				12(4)	50(19)	
2348(10)											
2403.8(3)								58(5)			
2481.3(5)	5 ⁻ ,7 ⁻	3	0.18		72Le17						
2488.6(10)	3,1								55(27)		
2517.3(5)	5 ⁻ ,7 ⁻	3	0.31		72Le17						47(4)
2519.2(5)								55(3)			18(2)
2537.3(8)	⟨3,1⟩						62(9)		24(14)		
2552(10)											
2570.7(5)											
2571(10)	1 ⁻ ,3 ⁻	1	0.07		72Le17						
2596(10)											
2611(10)											
2630(10)											
2643.7(2)								46(3)			54(3)
2660(10)											
2695(10)											
2712(10)											
2728.7(2)								53(4)			
2742(10)	1 ⁻ ,3 ⁻	1	0.09		72Le17						
2775(10)											
2815.8(3)								83(8)	17(6)		
2825.1(3)							61(5)	39(4)			

Additional data on this isotope can be found in [02Ur04, 02Ta01].

Energy levels and branching ratios [01Tu07]. Part 2

¹⁴³Ce
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E^*	$2J^\pi$	Branching ratios in percentage										
[keV]		E_f^* :	662.7	808.2	817.0	862.1	1095.3	1116.8	1154.1	1167.6	1172.5	1220.0
		$2J_f^\pi$:	9^-	3^-		$\langle 1 \rangle^-$			3^-		$3^-, \langle 1 \rangle^-$	9^-
1095.3(2)			12(1)									
1116.8(3)	$\langle 11^+ \rangle$		86(6)									
1154.1(3)	3^-			0.9(4)								

(continued)

¹⁴³Ce
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E^* [keV]	$2J^\pi$	Branching ratios in percentage										
		$E_f^*:$ $2J_f^\pi:$	662.7 9 ⁻	808.2 3 ⁻	817.0	862.1 $\langle 1 \rangle^-$	1095.3	1116.8	1154.1 3 ⁻	1167.6	1172.5 3 ⁻ , $\langle 1 \rangle^-$	1220.0 9 ⁻
1628.7(4)	3,1			12(6)								
1676.9(3)							41(3)	27(3)				
1726.7(2)			16(2)									
1835.2(8)	$\langle 1 \rangle^-$			32(5)		41(5)						
1906.1(5)	$\langle 7 \rangle^-$		30(3)					70(7)				
1913.4(11)	$\langle 1 \rangle^-$			50(10)							<26	
1989.5(4)					54(6)							
1993.3(6)	$\langle 3 \rangle^-$			9(2)							4(2)	
2027.4(8)	$\langle 1^- \rangle$					43(7)						
2057.0(4)					100							
2065.3(7)					60(5)			40(4)				
2255.3(4)			100									
2272.7(10)	1 ⁻ , 3								33(17)			
2307.2(6)	$\langle 5^-, 7^- \rangle$						26(3)			74(7)		
2313.9(8)	3 ⁻ , 1 ⁻			38(12)								
2403.8(3)			42(4)									
2481.3(5)	5 ⁻ , 7 ⁻				100							
2519.2(5)			3.5(6)				3.7(6)	6.7(7)				3.3(4)
2537.3(8)	$\langle 3, 1 \rangle$					14(5)						
2570.7(5)							79(6)	21(2)				
2728.7(2)			25(5)					23(5)				

Energy levels and branching ratios [01Tu07]. Part 3

¹⁴³Ce
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E^* [keV]	$2J^\pi$	$E_f^*:$ $2J_f^\pi:$	Branching ratios in percentage		
			1572.4 1 ⁻ , 3 ⁻	1598.7	2057.0
2061.5(6)	3 ⁻		12(5)		
2313.9(8)	3 ⁻ , 1 ⁻		<50		
2488.6(10)	3, 1		45(9)		
2517.3(5)	5 ⁻ , 7 ⁻			53(4)	
2519.2(5)					9.6(8)

Energy levels and branching ratios [01So16].

¹⁴⁴Ce
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E^*	J^π	$T_{1/2}$ or	Branching ratios in percentage						
[keV]		Γ_{cm}	$E_{\text{f}}^*:$ $J_{\text{f}}^\pi:$	0.0 0 ⁺	397.4 2 ⁺	938.6 4 ⁺	1242.2 <3 ⁻ >	1489.0 2 ^{<+>}	1523.7 <5 ⁻ >
0.0	0 ⁺	284.91(5) d							
397.441(9)	2 ⁺	35.4(20) ps		100					
938.65(6)	4 ⁺				100				
1242.21(15)	<3 ⁻ >				94(4)	6.2(4)			
1346.1(7)	<1>		x	x					
1489.0(3)	2 ^{<+>}		58(5)	42(5)					
1523.67(10)	<5 ⁻ >					100			
1646.80(17)	<6 ⁺ >					100			
1673.67(18)	4 ⁺				13.1(9)	58(2)	29.4(13)		
1691.53(22)	3 ^{<+>}				83(8)		17(2)		
1819.0(4)	2 ⁺		10(10)	90(9)					
1829.01(19)	4 ⁺			65(3)	19.8(16)	14.8(16)			
1864.5(4)	1		32(12)	68(11)					
1890.92(18)	5 ^{<+>} ,3					67(9)			33(3)
1991.55(22)	3,5					79(5)			21(4)
1994.34(19)	<7 ⁻ >								x
2021.1(4)	3 ^{<+>}				56(8)	44(8)			
2028.7(4)	1 ^{<+>}		25(4)	75(7)					
2040.7(3)	3 ^{<+>}			14(7)	61(6)	25(4)			
2112.10(19)	2 ⁺ ,<1 ⁺ >		18(7)	82(15)					
2127.0(3)	2 ⁺ ,3 ^{<+>} ,4								
2152.8(4)	2 ⁺		21(10)	79(13)	<36.56				
2220.8(4)	4 ^{<->}				15(4)	85(5)			
2339.8(4)	2 ^{<+>}		11.48	59(5)	30(4)				
2352.6(4)	2 ⁺		20(8)	38(1)	42(8)				
2368.77(19)	<8 ⁺ >								
2405.2(4)	3,2 ^{<+>}				100				
2447.5(10)					100				
2534.3(3)	3 ^{<+>}				4.4(12)				
2536.6(6)	2,3 ^{<+>} ,4						100		
2623.2(5)						100			
2636.74(21)	<9 ⁻ >								
2642.41(21)	4 ^{<+>} ,<2 ⁺ >							6(1)	
2692.8(5)	4 ^{<+>} ,3					47(9)			
2749.9(4)	2 ⁺		11(3)	42(1)					
2802.5(9)						100			
2881.7(3)	3,5 ^{<->}					13(3)			11(4)
2882.0(7)	2 ⁺		29(6)				71(11)		
2903.6(4)	<3 ⁻ ,4 ⁺ ,2>					20(5)	38(6)		43(6)
2937.3					100				
2998.7(3)	2 ⁺		11(3)				19(5)		
3007.9(9)	1 ^{<->} ,2 ⁺		24(6)				76(12)		
3060.1(5)	1 ^{<->}		4.0(10)	64(3)			13(3)		
3173.0(5)	2,3						15(5)		
3197.18(24)	4 ^{<+>} ,<3 ⁺ >					7.0(8)	10(2)		15(2)

(continued)

¹⁴⁴Ce
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E^* [keV]	J^π	$T_{1/2}$ or Γ_{cm}	Branching ratios in percentage						
			$E_f^*:$ $J_f^\pi:$	0.0 0 ⁺	397.4 2 ⁺	938.6 4 ⁺	1242.2 3 ⁻	1489.0 2 ⁽⁺⁾	1523.7 5 ⁻
3209.3(6)							48(10)		
3238.85(25)	4 ⁽⁻⁾ , 2 ⁽⁺⁾					4.5(9)	39(2)		12(2)
3263.0(5)	2 ⁺ , 3, 4 ⁺				60(5)	33(5)			
3278.6(6)						18(5)	35(7)		
3293.5(6)					20(4)		35(6)	45(6)	
3335.74(23)	11 ⁻								
3371.9(6)							17(8)		
3396.2(11)							100		
3408.5(4)							24(5)		
3424.2					68(14)		32(11)		
3566.1(5)							19(4)		
3597.1(6)							29(6)		
3614.2(20)							100		
3628.9(7)	1 ⁽⁻⁾ , 2 ⁺			13(3)			<27.87		
3635.0(6)	1 ⁽⁻⁾ , 2 ⁺			13(4)			<32.94	26(11)	
3790.1(5)							18(6)		
3973.6(12)							100		

Data for this isotope are considered in vol. LB I/18B.

Energy levels and branching ratios [01So16]. Part 2

¹⁴⁴Ce
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E^* [keV]	J^π	Branching ratios in percentage									
		$E_f^*:$ $J_f^\pi:$	1646.8 6 ⁺	1673.7 4 ⁺	1691.5 3 ⁽⁺⁾	1819.0 2 ⁺	1829.0 4 ⁺	1864.5 1	1890.9 5 ⁽⁺⁾ , 3	1991.5 3, 5	1994.3 7 ⁻
1994.34(19)	7 ⁻		100								
2127.0(3)	2 ⁺ , 3 ⁽⁺⁾ , 4			100							
2368.77(19)	8 ⁺		40								60
2534.3(3)	3 ⁽⁺⁾			8.5(13)			64(3)		22.9(16)		
2636.74(21)	9 ⁻										100
2642.41(21)	4 ⁽⁺⁾ , 2 ⁺			43(2)	25(5)		6.4(10)		20(2)		
2881.7(3)	3, 5 ⁽⁻⁾				19(4)	14(4)					
2903.6(4)	3 ⁻ , 4 ⁺ , 2				<28.01						
2998.7(3)	2 ⁺				10(3)		25(5)			8(3)	
3173.0(5)	2, 3			51(8)				34(7)			
3197.18(24)	4 ⁽⁺⁾ , 3 ⁺			38(2)	4(1)						
3209.3(6)										52(11)	
3238.85(25)	4 ⁽⁻⁾ , 2								20(2)	5(2)	

Energy levels and branching ratios [01So16]. Part 3

¹⁴⁴Ce
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E^* [keV]	J^π	Branching ratios in percentage									
		E_f^* : J_f^π :	2021.1 3 ⁽⁺⁾	2028.7 1 ⁽⁺⁾	2040.7 3 ⁽⁺⁾	2112.1 2 ⁺ , ⁽⁺⁾ 1 ⁺	2127.0	2152.8 2 ⁺	2220.8 4 ⁽⁻⁾	2339.8 2 ⁽⁺⁾	2352.6 2 ⁺
2692.8(5)	4 ⁽⁺⁾ ,3										53(9)
2749.9(4)	2 ⁺							47(8)			
2881.7(3)	3,5 ⁽⁻⁾			42(4)							
2998.7(3)	2 ⁺						27(5)				
3060.1(5)	1 ⁽⁻⁾							19(3)			
3197.18(24)	4 ⁽⁺⁾ , ⁽⁺⁾ 3 ⁺		5(2)			8(2)	11(1)	2.0(8)			
3238.85(25)	4 ⁽⁻⁾ , ⁽⁻⁾ 2 ⁻								3.6(8)		
3278.6(6)					47(8)						
3408.5(4)			45(7)		31(7)						
3790.1(5)										61(15)	21(12)

Energy levels and branching ratios [01So16]. Part 4

¹⁴⁴Ce
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E^* [keV]	J^π	Branching ratios in percentage									
		E_f^* : J_f^π :	2368.77 8 ⁺	2405.2 3,2 ⁽⁺⁾	2623.2	2636.74 9 ⁻	2749.9 2 ⁺	2802.5	2881.7 3,5 ⁽⁻⁾	2882.0 2 ⁺	2903.6
2636.74(21)	9 ⁻	x									
3238.85(25)	4 ⁽⁻⁾ , ⁽⁻⁾ 2 ⁻			12(1)					3.7(9)		
3263.0(5)	2 ⁺ ,3,4 ⁺			8(7)							
3335.74(23)	11 ⁻					100					
3371.9(6)							83(25)				
3566.1(5)								20(5)			60(5)
3597.1(6)					71(12)						
3628.9(7)	1 ⁽⁻⁾ ,2 ⁺									87(10)	
3635.0(6)	1 ⁽⁻⁾ ,2 ⁺				61(13)						

Energy levels [93Pe07].

¹⁴⁵Ce
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E^* [keV]	$2J^\pi$	$T_{1/2}$ or Γ_{cm}	Ref.
0.0 ^a	5 ⁻	3.01(6) m	05Ve09
70.0(2)	7 ⁻		
168 ^a	9 ⁻		05Ve09
234.1(3)			
355.9(2)			
447.2(2)			
505.7(2)			
522.2(3)			

(continued)

¹⁴⁵Ce
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E^*	$2J^\pi$	$T_{1/2}$ or	Ref.
[keV]		Γ_{cm}	
549 ^a	$\langle 13^- \rangle$		05Ve09
632.6(3)			
664.3(2)			
671.8(2)			
708.7(3)			
840.5(2)			
959.5(2)			
1001.9			
1021.5			
1113 ^a	$\langle 17^- \rangle$		05Ve09
1127 ^b	$\langle 15^+ \rangle$		05Ve09
1155.2(4)			
1166.1(4)			
1284.9(5)			
1495 ^b	$\langle 19^+ \rangle$		05Ve09
1510.8(4)			
1596.5			
1690.0(5)			
1841 ^a	$\langle 21^- \rangle$		05Ve09
1889.5(4)			
1946.1			
2016 ^b	$\langle 23^+ \rangle$		05Ve09
2156.0(3)			
2205.6(4)			
2359.8			
2377.1(5)			
2543.9(6)			
2606.9(5)			
2689 ^b	$\langle 27^+ \rangle$		05Ve09
2811 ^d			
3268 ^c	$\langle 29^+ \rangle$		05Ve09
3321 ^d			
3477 ^b	$\langle 31^+ \rangle$		05Ve09
3922 ^c			
4591 ^c			
	$\langle 33^+ \rangle$		05Ve09
	$\langle 37^+ \rangle$		05Ve09

a,b,c,d mark 4 high-spin bands proposed in [05Ve09].