¹²⁸Te(¹¹B,4n γ),¹³³Cs(α ,2n γ) **1990XuZW**,1977Ch23

| | History | | |
|-----------------|--|---------------------|------------------------|
| Туре | Author | Citation | Literature Cutoff Date |
| Full Evaluation | Balraj Singh, Alexander A. Rodionov And Yuri L. Khazov | NDS 109, 517 (2008) | 22-Jan-2008 |

1990XuZW (also 1990XuZY): ¹²⁸Te(¹¹B,4n γ) E=61 MeV. Enriched target. Six Compton-suppressed Ge detector array. Measured γ , $\gamma\gamma$, $\gamma\gamma(\theta)$, excitation functions (E(¹¹B)=57-61 MeV), γ (t).

Additional information 1. 1977Ch23: ¹³³Cs(α ,2n γ) E=28 MeV. Measured E γ , I γ , $\gamma\gamma$, $\gamma(\theta)$.

Others:

1988NyZZ: ¹³³Cs(α ,2n γ) E=20 MeV. Measured $\gamma\gamma$ energy correlations.

1976Le29: ¹³³Cs(α ,2n γ) E=27 MeV. Measured $\gamma(\theta$,H,t), g factor.

1973Le09: ¹²⁸Te(¹¹B,4n γ) E=50 MeV. Measured F (γ, η, γ) , g factor. 1973La09: ¹²⁸Te(¹¹B,4n γ) E=50 MeV. Measured E γ , I γ , $\gamma\gamma$, $\gamma(\theta)$. 1973Na08: ¹²²Sn(¹⁴N,n γ). Four γ rays (119, 202, 584, 593) reported.

¹³⁵La Levels

| E(level) | $J^{\pi \dagger}$ | T _{1/2} | Comments |
|------------------------------------|------------------------------|------------------|---|
| 0.0 | 5/2+ | | |
| 119.2 ^{#} 2 | 7/2+ | | |
| 583.3 [‡] 2 | 9/2+ | | |
| 715.7 <mark>#</mark> 2 | $(11/2^+)$ | | |
| 785.5 [@] 2 | $11/2^{-}$ | <20 ns | T _{1/2} : from 1973Le09. |
| 1377.5 [@] 3 | $(15/2^{-})$ | | |
| 1385.3 [‡] <i>3</i> | $(13/2^+)$ | | |
| 1437.0 ^{&} 3 | $(13/2^{-})$ | | |
| 1500.5 [#] 2 | $(15/2^+)$ | | |
| 1757.0 3 | $(15/2^{-})$ | | J^{π} : 1973Le09 suggested 19/2 ⁻ , but $\Delta J=1$, D+Q for 319.8 γ to (13/2 ⁻) makes this assignment unlikely and suggests 15/2, assuming ascending spins in (HL xn γ) reactions. |
| | | | Positive A ₂ and R(DCO) for 379.4 γ to (15/2 ⁻) are consistent with Δ J=0, dipole. |
| 1987.8? 4 | $(15/2^{-})$ | | Level not reported by 1990XuZW. |
| 2121.3 ^{&} 3 | $(17/2^{-})$ | | |
| 2132.2 3 | $(19/2^{-})$ | | J^{n} : 23/2 ⁻ suggested by 1973Le09 lowered by 2 units as for 1758 level. |
| $2232.4 \circ 3$ | $(19/2^{-})$ $(21/2^{-})$ | <20 ns | I_{2}^{π} , 25/2 ⁻ suggested by 10731 a00 lowered by 2 units as for 1758 level |
| | (21/2) | <20 IIS | $T_{1/2}$: from 1973Le09. |
| 2303.8 [‡] 4 | $(17/2^+)$ | | |
| 2400.6 [#] 3 | $(19/2^+)$ | | |
| 2494.1 ^{<i>a</i>} 3 | $(19/2^+)$ | | |
| 2507.05 $2626.2^{a}.3$ | $(19/2^+)$ $(21/2^+)$ | | |
| 2735.3 3 | $(23/2^{-})$ | 25.9 ns 15 | g=0.003 15 (1976Le29) |
| | | | J^{π} : 27/2 ⁺ suggested by 1973Le09 lowered by 2 units as for 1758 level. |
| | | | $T_{1/2}$: from $\gamma(t)$ (1990XuZW). Other:~50 ns (1973Le09). |
| | | | Calculated (19/6Le29) μ for Configuration= $((\pi g_{7/2})^{-1}(\nu h_{11/2}10^+))_{27/2}$ is in agreement with the measured value, but J=27/2 is unlikely for 2737 level. |
| 2795.5 <mark>&</mark> <i>3</i> | $(21/2^{-})$ | | |
| 2811.2 ^{<i>a</i>} 4 | $(23/2^+)$ | | |
| 2973.04 | (25/2) | | |
| $3105 4^{@} 3$ | $(23/2^{-})$ | | |
| 3169.8 4 | (23/2) | | |
| 3180.8 4 | $(23/2^{-})$ | | |
| | | | |

| ¹²⁸ Te(¹¹ B,4n γ), ¹³³ Cs(α ,2n γ) | 1990XuZW,1977Ch23 | (continued) |
|--|-------------------|-------------|
|--|-------------------|-------------|

| | | | | | a Levels (e | continued) | |
|------------------------------------|-------------------|-------------------------|--------------|-----------------------|--------------|-----------------------|---------------------|
| E(level) | $J^{\pi \dagger}$ | E(level) | Jπ† | E(level) | Jπ† | E(level) | J^{π}^{\dagger} |
| 3438.2 4 | $(27/2^{-})$ | 3958.9 <mark>b</mark> 4 | (29/2-) | 5001.0 5 | | 6158.4 ^c 5 | (39/2-) |
| 3499.8 <mark>&</mark> <i>3</i> | $(25/2^{-})$ | 4262.5 4 | $(29/2^{-})$ | 5209.2 ^C 4 | $(33/2^{-})$ | 6630.4 [°] 6 | $(41/2^{-})$ |
| 3522.4 ^a 5 | $(27/2^+)$ | 4318.3 ^b 4 | $(31/2^{-})$ | 5379.0 ^b 5 | $(35/2^{-})$ | 7159.4 ^C 6 | $(43/2^{-})$ |
| 3638.4 <mark>b</mark> 4 | $(27/2^{-})$ | 4552.5 4 | | 5461.2 ^C 4 | $(35/2^{-})$ | | |
| 3837.1 [@] 4 | $(27/2^{-})$ | 4695.1 [@] 4 | $(31/2^{-})$ | 5564? | | | |
| 3890.4 ^a 5 | $(29/2^+)$ | 4820.5 ^b 5 | $(33/2^{-})$ | 5772.2 [°] 5 | $(37/2^{-})$ | | |

¹³⁵La Levels (continued)

[†] From Adopted Levels for J≤15/2. Above 15/2, the assignments are primarily based on $\gamma\gamma(\theta)$ (DCO) of 1990XuZW.

[‡] Band(A): $d_{5/2}$ band.

[#] Band(B): g_{7/2} band.

[@] Band(C): $h_{11/2}$ band, $\alpha = -1/2$.

[&] Band(D): $h_{11/2}$ band, $\alpha = +1/2$.

^{*a*} Band(E): band 1.

^b Band(F): band 2.

^c Band(G): band 3.

$\gamma(^{135}\text{La})$

R(DCO) values are from 1990XuZW, gated on $\Delta J=2$, quadrupole transitions.

| | γ -ray inte | ensities in | n ¹³³ Cs(a | α,2nγ) Ε | =28 MeV | (1977Ch2 | 23) |
|------------------------|-------------------------|------------------------|-----------------------|------------------|----------------------|--------------------|--|
| | Eγ | Iγ | | Eγ | $I\gamma$ | | |
| | 119.4 | 59 | | 592.9 | 51 | | |
| | 133.5 | 16 | | 597.0 | 38 | | |
| | 202.0 | 70 | | 652.2 | 17 | | |
| | 319.8 | 7.5 | | 744.7 | 7 | | |
| | 375.6 | 24 | | 785.2 | 21 | | |
| | 379.4 | 31 | | 802.0 | 8.5 | | |
| | 464.4 | 6 | | 855.7 | 11.3 | | |
| | 470.0 | 18 | | 902.2 | 7.2 | | |
| | 550.8 | 3 | | 919.6 | 5.7 | | |
| | 583.6 | 100 | | | | | |
| E_{γ}^{\dagger} | I_{γ}^{\ddagger} | E _i (level) | \mathbf{J}_i^{π} | \mathbf{E}_{f} | J_f^π | Mult. [#] | Comments |
| 64.0 2 | 3.3 7 | 3169.8 | | 3105.4 | (23/2 ⁻) | | |
| 119.3 [@] 2 | 30.6 [@] 11 | 119.2 | $7/2^{+}$ | 0.0 | $5/2^{+}$ | (D) | $A_2 = -0.05 \ 4 \ (1973 Le 09).$ |
| 119.3 [@] 2 | 1.2 [@] 8 | 2626.2 | $(21/2^+)$ | 2507.0 | (19/2+) | | R(DCO)=0.84 (quoted by 1990XuZW for this line, but it probably refers to the doublet). |
| 132.0 2 | 2.1 6 | 2626.2 | $(21/2^+)$ | 2494.1 | $(19/2^+)$ | (D) | R(DCO)=0.71. |
| 133.7 2 | 61.8 5 | 2265.7 | (21/2 ⁻) | 2132.2 | (19/2 ⁻) | D | Additional information 7. $A_{2}=-0.19.2$ (1973) e09), R(DCO)=0.87. |
| 138.0 2 | 22.6 6 | 3638.4 | $(27/2^{-})$ | 3499.8 | (25/2 ⁻) | (D) | E_{γ} : level-energy difference=138.6. R(DCO)=0.71 |
| 185.0 2 | 1.4 5 | 2811.2 | $(23/2^+)$ | 2626.2 | $(21/2^+)$ | (D) | R(DCO)=0.58. |

$\frac{128}{16} Te(^{11}B,4n\gamma),^{133}Cs(\alpha,2n\gamma)$ **1990XuZW,1977Ch23** (continued)

$\gamma(^{135}La)$ (continued)

| E_{γ}^{\dagger} | I_{γ}^{\ddagger} | E _i (level) | \mathbf{J}_i^{π} | $E_f \qquad J_f^{\pi}$ | Mult.# | Comments |
|------------------------|-------------------------|------------------------|----------------------|-----------------------------|---------------------------------|--|
| 202.1 2 | 97.2 3 | 785.5 | 11/2- | 583.3 9/2+ | D | Additional information 3. $A_{2}=-0.23.2$ (1973) $e^{(0)}$ R(DCO)=0.72 |
| 237.9 2 | 23.9 5 | 2973.0 | (25/2-) | 2735.3 (23/2 ⁻) | | R(DCO)=0.90 consistent with $\Delta J=1,D$ or $\Delta J=2,Q$. 1990XuZW assign $\Delta J=1$. |
| 251.9 2 | 3.5 4 | 5461.2 | $(35/2^{-})$ | 5209.2 (33/2-) | | - |
| 256.7 2 | 0.7 4 | 1757.0 | $(15/2^{-})$ | $1500.5 (15/2^+)$ | | |
| 268.0 2 | 1.7 3 | 3079.2 | $(25/2^+)$ | $2811.2 (23/2^+)$ | (D) | R(DCO)=0.49. |
| 311.0 2 | 4.6 5 | 5772.2 | $(37/2^{-})$ | 5461.2 (35/2 ⁻) | D | R(DCO)=0.61. |
| 319.9 2 | 5.9 12 | 1757.0 | $(15/2^{-})$ | $1437.0 (13/2^{-})$ | D+Q | $A_2 = -0.49 \ 15 \ (1977 \text{Ch}23).$ |
| 320.5 2 | 18.2 6 | 3958.9 | $(29/2^{-})$ | 3638.4 (27/2 ⁻) | D | R(DCO)=0.56. |
| 329.7 2 | 9.5 2 | 3499.8 | (25/2 ⁻) | 3169.8 | | R(DCO)=0.92 consistent with $\Delta J=1,D$ or $\Delta J=2,Q$. 1990XuZW assign $\Delta J=1$. |
| 359.6 2 x364 0 2 | 10.4 2 | 4318.3 | $(31/2^{-})$ | 3958.9 (29/2 ⁻) | D | R(DCO)=0.57. |
| 368.0.2 | ≤ 0.5 | 3890.4 | $(29/2^{+})$ | $3522.4(27/2^+)$ | | |
| 375 4 2 | $\underline{\leq}0.3$ | 2132.2 | $(19/2^{-})$ | $1757.0 (15/2^{-})$ | (0) | Additional information 6 |
| 575.12 | 05.5 2 | 2152.2 | (1)/2) | 1157.0 (15/2) | | $A_{2}=+0.14.2$ (1973Le09), R(DCO)=1.11. |
| | | | | | | 375.6-379.4 cascade is reversed in 1973Le09. |
| 379.7 2 | 62.8 4 | 1757.0 | $(15/2^{-})$ | $1377.5 (15/2^{-})$ | (D) | Additional information 5. |
| | | | | | | Mult.: $\Delta J=0$, dipole from A ₂ =+0.15 2 (1973Le09), R(DCO)=1.09. These data are also consistent with $\Delta J=2$, quadrupole. |
| 386.2 2 | 2.9 3 | 6158.4 | $(39/2^{-})$ | 5772.2 (37/2 ⁻) | (D) | R(DCO)=0.85. |
| 394.7 2 | 3.0 4 | 3499.8 | $(25/2^{-})$ | 3105.4 (23/2 ⁻) | (D) | R(DCO)=0.71. |
| 434.6 2 | 6.2 5 | 3169.8 | | 2735.3 (23/2 ⁻) | | $R(DCO)=1.05$ indicates $\Delta J=2,Q$. |
| 443.2 2 | 1.8 7 | 3522.4 | $(27/2^+)$ | 3079.2 (25/2+) | (D) | R(DCO)=0.83. |
| 448.5 2 | ≤0.5 | 5001.0 | 1 | 4552.5 | | |
| 464.1 2 | 9.4 6 | 583.3 | 9/2+ | 119.2 7/2+ | D+Q | $A_2 = -0.43 \ I5 \ (1977 Ch23).$ |
| 465.0 2 | 3.8 3 | 3438.2 | $(27/2^{-})$ | $2973.0 (25/2^{-})$ | $\mathbf{D}(\cdot, \mathbf{O})$ | |
| 469.9 2 | 50.0 3 | 2735.3 | (23/2) | 2265.7 (21/2) | D(+Q) | Additional information 8. $A_2 = -0.47 \ 4 \ (1973Le09). \ R(DCO) = 0.71.$ |
| 472.0 2 | ≤0.5 | 6630.4 | $(41/2^{-})$ | $6158.4 (39/2^{-})$ | _ | |
| 502.1 2 | 5.5 3 | 4820.5 | $(33/2^{-})$ | $4318.3 (31/2^{-})$ | D | R(DCO)=0.66. |
| 526.6 2 | 1.6.5 | 3499.8 | (25/2) | 29/3.0(25/2) | | |
| 529.0 2 | ≤0.5 | /159.4 | (43/2) | 6630.4 (41/2) | | |
| 550.8 ^{cc} 3 | | 1987.8? | (15/2 ⁻) | 1437.0 (13/2 ⁻) | D+Q | Weak γ (1 γ =3) reported by 1977Ch23 only. A ₂ =-0.46 20 (1977Ch23). |
| 558.5 2 | 3.7 7 | 5379.0 | $(35/2^{-})$ | 4820.5 (33/2 ⁻) | D | R(DCO)=0.56. |
| 563 ^{&} | | 5564? | | 5001.0 | | |
| ^x 576.0 2 | ≤0.5 | | | | | |
| x576.8 2 | 2.4 6 | | | | | |
| 583.2 2 | 100 | 583.3 | 9/2+ | $0.0 \ 5/2^+$ | (Q) | Additional information 2. $A_2=+0.21$ 2 (1973Le09). |
| 591.9 2 | 90.0 2 | 1377.5 | (15/2 ⁻) | 785.5 11/2- | (Q) | Additional information 4. $A_2=+0.19$ 2 (1973Le09). R(DCO)=1.14. |
| 596.5 2 | 21.2 5 | 715.7 | $(11/2^+)$ | 119.2 7/2+ | (Q) | $A_2 = +0.26 \ 10 \ (1977 \text{Ch}23).$ |
| ^x 614.7 2 | 1.1 7 | | | | | - |
| 624.0 2 | 4.4 8 | 4262.5 | $(29/2^{-})$ | 3638.4 (27/2-) | D | R(DCO)=0.62. |
| ^x 636.0 2 | ≤0.5 | | | | | |
| 651.4 2 | 10.1 6 | 1437.0 | $(13/2^{-})$ | 785.5 11/2- | D+Q | A ₂ =-0.60 15 (1977Ch23). R(DCO)=0.41. |
| 656.2 2 | ≤0.5 | 3837.1 | $(27/2^{-})$ | 3180.8 (23/2 ⁻) | | |
| x663.0 2 | ≤0.5 | | | | | |
| 666.0 2 | 16.5 5 | 3638.4 | (27/2 ⁻) | 2973.0 (25/2 ⁻) | (Q) | E_{γ} : level-energy difference=665.4. R(DCO)=1.38. |
| 674.1 2 | 4.5 9 | 2795.5 | $(21/2^{-})$ | 2121.3 (17/2 ⁻) | (Q) | R(DCO)=0.92. |
| 684.4 2 | ≤0.5 | 2121.3 | $(17/2^{-})$ | 1437.0 (13/2 ⁻) | (Q) | R(DCO)=1.02. |
| | | | | | | |

Continued on next page (footnotes at end of table)

¹²⁸Te(¹¹B,4n γ),¹³³Cs(α ,2n γ) **1990XuZW**,1977Ch23 (continued)

$\gamma(^{135}La)$ (continued)

| E_{γ}^{\dagger} | I_{γ} | E _i (level) | \mathbf{J}_i^π | $\mathbf{E}_f \qquad \mathbf{J}_f^{\pi}$ | Mult. [#] | Comments |
|------------------------|------------------------|------------------------|------------------------------|--|--------------------|---|
| 703.0 2 | 6.4 2 | 3438.2 | $(27/2^{-})$ | 2735.3 (23/2- | ·) (O) | R(DCO)=1.23. |
| 704.2 2 | | 3499.8 | $(25/2^{-})$ | 2795.5 (21/2- | ·) | I_{γ} : not available. |
| 715.1 & 2 | < 0.5 | 1500.5 | $(15/2^+)$ | 785.5 11/2- | | F_{ac} : treated as uncertain (evaluators) in view of |
| , 1011 2 | _0.0 | 100010 | (10/2) | , | | mult=M2 from ΔJ^{π} . |
| ^x 719.6 2 | 2.8 11 | | | | | R(DCO)=1.28. |
| 731.7 2 | 1.9 7 | 3837.1 | $(27/2^{-})$ | 3105.4 (23/2- | ·) (Q) | R(DCO)=1.16. |
| ^x 739.0 2 | 0.6 5 | | | | | |
| 743.6 2 | 4.5 4 | 2121.3 | $(17/2^{-})$ | 1377.5 (15/2- |) D+Q | Placement from 1990XuZW. 1977Ch23 suggested from |
| | | | | | | a 1530 level to 786 level. |
| | | | | | | A ₂ =-0.53 20 (1977Ch23), R(DCO)=0.32. |
| x754.0 2 | ≤0.5 | | | | | |
| 764.2 2 | 2.7 8 | 3499.8 | $(25/2^{-})$ | 2735.3 (23/2- | ·) | $R(DCO)=0.89$ is low for $\Delta J=2,Q$ assigned by |
| x=<= 0.2 | .o. f | | | | | 1990XuZW. |
| */6/.0 2 | ≤0.5 | 1500 5 | (15/0+) | 7157 (11/0+ | (\mathbf{O}) | A |
| /84.9 2 | 8.0 3 | 1500.5 | $(15/2^+)$ | /15./(11/2) |) (Q) | $A_2 = +0.21 \ I0 \ (1977Ch23). \ R(DCO) = 0.97.$ |
| 802.0 2 | 5.4 / 10.0 <i>4</i> | 1385.5 | $(13/2^{+})$ $(10/2^{-})$ | $383.3 9/2^{-1}$ | (\mathbf{Q}) | $A_2 = +0.20$ IS (1977Ch23). R(DCO)=1.19. |
| 0.54.7 2 | 19.9 4 | 2232.4 4605 1 | (19/2) $(21/2^{-})$ | 1377.3 (13/2) 2827.1 (13/2) | | $A_2 = +0.14 \ 10 \ (1977 \ (123)), \ R(DCO) = 1.23.$ |
| 872 0 2 | ≤ 0.3 | 4095.1 | (31/2) $(33/2^{-})$ | 3637.1 (27/2) | (0) | P(DCO) = 1.38 |
| 900 1 2 | 24.6 | 2400.6 | $(23/2^{-})$ $(19/2^{+})$ | 1500.5 (15/2 ⁺ | (\mathbf{Q}) | $A_{2} = \pm 0.22 \ 15 \ (1977 \ Ch23) \ B(DCO) = 1.05$ |
| 017.2° 2 | 2. 4 0 | 1500.5 | (17/2) | 592.2 0/2 ⁺ |) (Q) | $R_2 = 10.22$ IS (1977 CH25), R(DCO)=1.05. |
| 917.3 2 | ≤0.5 | 1500.5 | $(15/2^{+})$ | 585.5 9/2 | | E_{γ} : treated as uncertain (evaluators) in view of mult=M3 from ΔJ^{π} . |
| 918.5 2 | 2.7 3 | 2303.8 | $(17/2^+)$ | 1385.3 (13/2+ | .) | A ₂ =+0.24 15 (1977Ch23), R(DCO)=0.67 is much too |
| | | | | | | low than ≈ 1 expected for $\Delta J=2,Q$ assigned by |
| | | | | | | 1990XuZW. |
| ^x 940.0 2 | 0.7 4 | | | | | |
| 946.7 2 | ≤0.5 | 5209.2 | $(33/2^{-})$ | 4262.5 (29/2- | .) | |
| 948.4 2 | 1.9 5 | 3180.8 | $(23/2^{-})$ | 2232.4 (19/2- | (Q) | R(DCO)=1.14. |
| 993.5 2 | 2.2 5 | 2494.1 | $(19/2^+)$ | 1500.5 (15/2* | (Q) | R(DCO)=1.14. |
| 1006.5 2 | 1.2.5 | 2507.0 | $(19/2^{+})$ | 1500.5 (15/2* |) (Q) | R(DCO)=0.97. |
| *1013.8 2 | 1.4 8 | 1550 5 | | 2428 2 (27/2- | | R(DCO)=0.77. |
| 1114.3 <i>2</i> | 1.// | 4552.5 | | 3438.2 (27/2 |) | $\mathbf{P}(\mathbf{D}(\mathbf{O})) = 0$ |
| [*] 1125.3 2 | 4.28 | 5461.0 | (25/2-) | 4219 2 (21/2- | (\mathbf{O}) | R(DCO)=2.28. |
| 1143.0 Z | 1.0 / | 3401.2 | (33/2) | 4318.3 (31/2 | | K(DCO)=0.90 |
| 1202.2 2 | 1.9 12 | 5200.2 | $(33/2^{-})$ | 3058 0 (20/2- | .) | R(DCO) = 0.09. $R(DCO) = 1.83$ is too large for $\Delta I = 2.0$ assigned by |
| 1230.3 2 | 1.3 0 | 5209.2 | (33/2) | 3730.7 (29/2 |) | 1990XuZW. |

[†] From 1990XuZW.

[‡] From 1990XuZW for ¹²⁸Te(¹¹B,4n γ) E=61 MeV. Values for nine transitions at E=50 MeV were given by 1973Le09. Values from (α ,2n γ) reaction are given above.

[#] From $\gamma(\theta)$ and $\gamma\gamma(\theta)(DCO)$. 1990XuZW state that typical values of R(DCO) are: ≥ 1 for $\Delta J=2$, stretched quadrupole and ≤ 0.7 for $\Delta J=1$, stretched dipole. In practice, however, 1990XuZW seemed to have used the following criterion: R(DCO) ≈ 1 or R(DCO)>1 for $\Delta J=2$, quadrupole and R(DCO)<1 for $\Delta J=1$, dipole transitions. These assignments are considered tentative (by evaluators) since no uncertainties are given for R(DCO) values.

[@] Multiply placed with intensity suitably divided.

& Placement of transition in the level scheme is uncertain.

 $x \gamma$ ray not placed in level scheme.



¹³⁵₅₇La₇₈

Legend





¹³⁵₅₇La₇₈

6

128 Te(11 B,4n γ), 133 Cs(α ,2n γ) 1990XuZW,1977Ch23



¹³⁵₅₇La₇₈

$\frac{128}{128} \text{Te}(^{11}\text{B,4n}\gamma),^{133}\text{Cs}(\alpha,2n\gamma) \qquad 1990\text{XuZW,1977Ch23} \text{ (continued)}$



¹³⁵₅₇La₇₈