$^{137}_{55}\mathrm{Cs}_{82}$

## 1 Decay Scheme

The $^{137}$Cs decays by 100% beta-minus emission to the ground and excited states of the $^{137}$Ba.
*Le* $^{137}$Cs *se désintègre à 100 % par émission bêta moins vers l'état fondamental et les états excités du* $^{137}$Ba.

## 2 Nuclear Data

$T_{1/2}(^{137}\mathrm{Cs}\ )$ : 30,018 (22) a
$Q^{-}(^{137}\mathrm{Cs}\ )$ : 1175,63 (17) keV

### 2.1 $\beta^-$ Transitions

| | Energy (keV) | Probability (%) | Nature | log $ft$ |
|---|---|---|---|---|
| $\beta^-_{0,2}$ | 513,97 (17) | 94,57 (26) | Forbidden $1^{st}$ unique | 9,7 |
| $\beta^-_{0,1}$ | 892,17 (18) | 0,0006 (1) | Forbidden $2^{nd}$ unique | 16,6 |
| $\beta^-_{0,0}$ | 1175,63 (17) | 5,43 (26) | Forbidden $2^{nd}$ non-unique | 12,8 |

### 2.2 Gamma Transitions and Internal Conversion Coefficients

| | Energy (keV) | $P_{\gamma+ce}$ (%) | Multipolarity | $\alpha_K$ ($10^{-1}$) | $\alpha_L$ ($10^{-1}$) | $\alpha_M$ ($10^{-1}$) | $\alpha_T$ ($10^{-1}$) |
|---|---|---|---|---|---|---|---|
| $\gamma_{1,0}$(Ba) | 283,46 (7) | 0,00063 (10) | M1+E2 | 0,461 (7) | 0,0726 (11) | 0,01516 (22) | 0,552 (8) |
| $\gamma_{2,1}$(Ba) | 378,20 (7) | 0,0000202 (20) | E5 | 4,63 (7) | 3,44 (5) | 0,787 (11) | 9,04 (13) |
| $\gamma_{2,0}$(Ba) | 661,657 (3) | 94,57 (26) | M4 | 0,915 (13) | 0,1648 (23) | 0,0352 (5) | 1,124 (16) |

# 3 Atomic Data

## 3.1 Ba

$\omega_K$ : 0,900 (4)
$\bar{\omega}_L$ : 0,110 (5)
$n_{KL}$ : 0,888 (4)

### 3.1.1 X Radiations

| | Energy (keV) | Relative probability |
|---|---|---|
| $X_K$ | | |
| $K\alpha_2$ | 31,8174 | 54,28 |
| $K\alpha_1$ | 32,1939 | 100 |
| $K\beta_3$ | 36,3045 | 29,41 |
| $K\beta_1$ | 36,3786 | |
| $K\beta_5''$ | 36,654 | |
| $K\beta_2$ | 37,258 | 7,41 |
| $K\beta_4$ | 37,312 | |
| $KO_{2,3}$ | 37,425 | |
| $X_L$ | | |
| $L\ell$ | 3,9544 | |
| $L\alpha$ | 4,4515 - 4,4666 | |
| $L\eta$ | 4,3307 | |
| $L\beta$ | 4,8278 - 5,207 | |
| $L\gamma$ | 5,3715 - 5,8104 | |

### 3.1.2 Auger Electrons

| | Energy (keV) | Relative probability |
|---|---|---|
| Auger K | | |
| KLL | 25,314 - 26,786 | 100 |
| KLX | 30,095 - 32,179 | 47,7 |
| KXY | 34,86 - 37,41 | 5,7 |
| Auger L | 2,6614 - 5,8064 | |

# 4 Electron Emissions

| | | Energy (keV) | Electrons (per 100 disint.) |
|---|---|---|---|
| $e_{AL}$ | (Ba) | 2,6614 - 5,8064 | 7,39 (5) |
| $e_{AK}$ | (Ba) | | |
| | KLL | 25,314 - 26,786 | 0,78 (4) |
| | KLX | 30,095 - 32,179 | |
| | KXY | 34,86 - 37,41 | |
| $ec_{2,0\ T}$ | (Ba) | 624,216 - 661,642 | 9,56 (14) |
| $ec_{2,0\ K}$ | (Ba) | 624,216 (3) | 7,78 (11) |
| $ec_{2,0\ L}$ | (Ba) | 655,668 - 656,410 | 1,401 (20) |
| $ec_{2,0\ M}$ | (Ba) | 660,364 - 660,876 | 0,2992 (43) |
| $\beta^-_{0,2}$ | max: | 513,97 (17) | 94,57 (26) |
| | avg: | 173,67 (6) | |
| $\beta^-_{0,1}$ | max: | 892,17 (18) | 0,0006 (1) |
| | avg: | 332,51 (7) | |
| $\beta^-_{0,0}$ | max: | 1175,63 (17) | 5,43 (26) |
| | avg: | 284,90 (5) | |

# 5 Photon Emissions

## 5.1 X-Ray Emissions

| | | Energy (keV) | Photons (per 100 disint.) | |
|---|---|---|---|---|
| XL | (Ba) | 3,9544 - 5,8104 | 0,919 (16) | |
| $XK\alpha_2$ | (Ba) | 31,8174 | 1,99 (4) | $K\alpha$ |
| $XK\alpha_1$ | (Ba) | 32,1939 | 3,66 (6) | |
| $XK\beta_3$ | (Ba) | 36,3045 | 1,078 (20) | $K'\beta_1$ |
| $XK\beta_1$ | (Ba) | 36,3786 | | |
| $XK\beta''_5$ | (Ba) | 36,654 | | |
| $XK\beta_2$ | (Ba) | 37,258 | 0,272 (8) | $K'\beta_2$ |
| $XK\beta_4$ | (Ba) | 37,312 | | |
| $XKO_{2,3}$ | (Ba) | 37,425 | | |

### 5.2 Gamma Emissions

| | Energy (keV) | Photons (per 100 disint.) |
|---|---|---|
| $\gamma_{1,0}$(Ba) | 283,46 (7) | 0,0006 (1) |
| $\gamma_{2,1}$(Ba) | 378,20 (7) | 0,0000106 (9) |
| $\gamma_{2,0}$(Ba) | 661,655 (3) | 85,01 (20) |

## 6 Main Production Modes

The $^{137}$Cs is mainly produced by thermal neutron-induced fission of the $^{235}$U in nuclear reactors.

## 7 References


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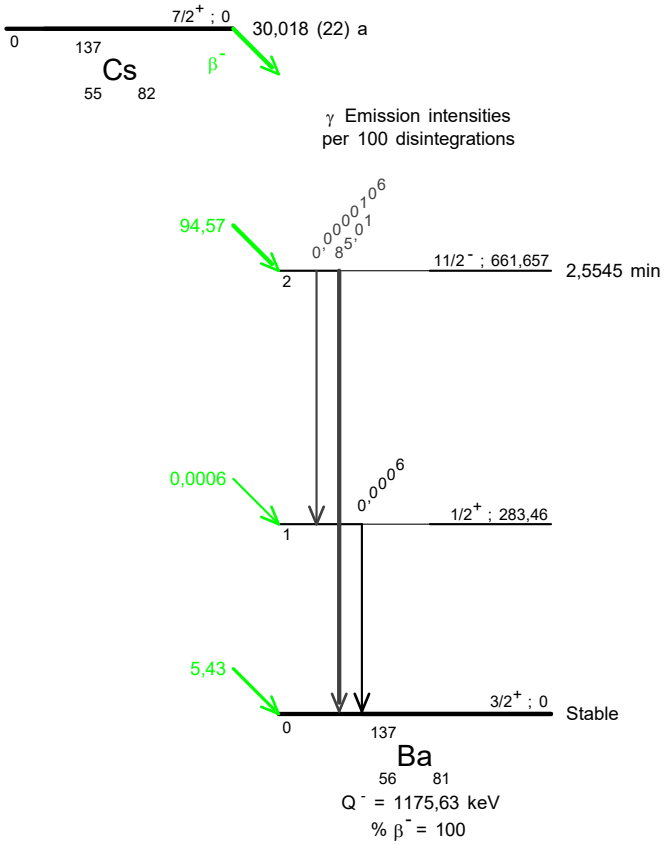
7/2+ ; 0
30,018 (22) a
0
137
Cs
55 82
β-
γ Emission intensities
per 100 disintegrations
94,57
0, 0 0 0 1 0 6
0, 8 5 0 1
11/2- ; 661,657
2,5545 min
2
0,0006
0, 0 0 0 6
1/2+ ; 283,46
1
5,43
3/2+ ; 0
Stable
0
137
Ba
56 81
Q- = 1175,63 keV
% β- = 100