# $^{131}Xe^{m}$ – Comments on evaluation of decay data by V. Chisté and M. M. Bé

## 1) Decay Scheme

$^{131}Xe^{m}$ decays by a strongly converted gamma transition.

## 2) Nuclear Data

Level energy, spin and parity are from Yu. V. Sergeenkov (94Se07).

The $^{131}Xe^{m}$ measured half-life values are, in days:

| | $T_{1/2}$ |
|---|---|
| Reference | Value (d) |
| Andersson (64An08) | 11,8 (1) |
| Knauf (66Kn09) | 11,94 (4) |
| Emery (72Em09) | 12,00 (2) |
| Meyer (74Me21) | 11,770 (12) |
| Hoffman (75Ho12) | 11,92 (3) |
| Tam (90Ta02) | 11,9 (2) |
| Unterweger (92Un03) | 11,934(21) |

The half-life weighted average was calculated with the Lweight program (version 3)

The value from Meyer (74Me21) was omitted from the analysis because it disagrees with the other values. The Emery (72Em09) and Anderson (64An08) values were rejected by the Lweight program, based on Chauvenet's criteria. The adopted value is the weighted mean : *11,930 d*, with an internal uncertainty of *0,016* and a $\chi^2$ of 0,08.

### 2.1) Gamma Transitions

The only gamma transition is of M4 multipolarity. The various theoretical conversion coefficients for this transition (Band *et al.* , Hager *et al.* , Rösel *et al.*) differ by 2 – 4 %. The value interpolated from the new Band *et al.* tables (ICC Computer Code (program Icc99v3a)) was adopted, following the recommendations of Gorozhankin (2002Go00).

The uncertainties in $\alpha_T$, $\alpha_K$ and $\alpha_L$ have been estimated as 3%.

## 3) Atomic Data

Atomic quantities ($\omega_K$, $\varpi_L$ and $n_{KL}$) are from Schönfeld (96Sc33).

The X-ray and Auger electron emission probabilities have been calculated from γ-ray and conversion electron data by using the program EMISSION.

## 4) Radiation emissions

### 4.1) Conversion electrons

The conversion electron emission probabilities were deduced from the ICC values and from the gamma-ray emission probability.
The total conversion electron emission probability is deduced from :

$P_{ek} = 100 - P\gamma = 100 - (1,98 \pm 0,06) = 98,02 \pm 0,06$

To our knowledge, there are no measured values for the conversion electron emission probabilities.

### 4.2) Gamma-ray emissions

Gamma-ray emission energy is from Yu. V. Sergeenkov et al. (94Se07) and R. A. Meyer (90Me15).

The gamma-ray emission intensity has been deduced from the transition probability and using the theoretical $\alpha_T$ to be : ***1,98(6)***.

We have not found measured values for this emission, the $^{131}Xe^{m}$ radioisotope being alone.

### Additional Reference

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