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

The first evaluation was done in 2002, it has been reviewed in December 2013. Literature available by this date was included.

1) Decay Scheme

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

2) Nuclear Data

Level energies, spins and parities are from Yu. Khazov *et al*. (2006Kh09).

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

	$T_{1/2}$	
Reference	Value (d)	Comments
Bergström (1952Be55)	12,0 (3)	
Andersson (1964An08)	11,8 (1)	
Knauf (1966Kn09)	11,94 (4)	
Emery (1972Em09)	12,00 (2)	
Meyer (1974Me21)	11,770 (12)	Omitted
Hoffman (1975Ho12)	11,92 (3)	
Tam (1990Ta02)	11,9 (2)	
Unterweger (2014Un**)	11,93 (3)	Replace 1992Un01, 2002Un02 and 2012Fi12
Adopted	**11,962 (20)**	χ^2/(n-1) = 1,4 ; ext. unc. = 0,016

The set of the eight values is quite discrepant with a χ^2/(n-1) of 15,3.
The value from Meyer *et al.* (1974Me21) was omitted from the analysis because it significantly disagrees with the other values, then the Andersson (1964An08) value was rejected by the Lweight program (version 3), based on Chauvenet's criterion. The adopted value is the weighted mean of the six remaining results: *11,962 d*, with the lowest experimental uncertainty of *0,020*.

2.1) Gamma Transitions

The only gamma transition was demonstrated being of M4 character (1954Be36, 1962Ge09, 1969Fr04). The various theoretical conversion coefficients for this transition (Band *et al.*, Hager *et al* , Rösel *et al.*) differ by about 2 - 4 %. The adopted ICC(s) are the theoretical values interpolated by the BrIcc program (2008Ki07) from the tables of Band *et al.* (2002Ba85), accepting the "frozen orbital (no hole)" approximation.

Reference	**Measured α_K**	**Theoretical ICC**
Bergström (1954Be36)	29 (4)	α_K = 31,6 (5)
Knauf (1966Kn03)	32,1 (4)	
Geiger (1966Ge01)	30,1 (6)	

3) Atomic Data

Atomic quantities (ω_K, ϖ_L and n_{KL}) are from Schönfeld and Janβen (1996Sc33).

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

4) Radiation emissions

4.1) Conversion electrons

The conversion electron emission intensities were deduced from the ICC values and the gamma transition probability.

4.2) Gamma-ray emissions

Gamma-ray emission energy is from the level energy and R. A. Meyer (1990Me15).

The gamma-ray emission intensity has been deduced from the transition probability using the theoretical α_T to be: **1,942 (26) %**.

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

Additional Reference

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