

$^{223}\text{Ra}$   $^{14}\text{C}$  decay [1989Br34](#),[1995Ho11](#),[1990Hu07](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	J. Chen # and F. G. Kondev		NDS 126, 373 (2015)	30-Sep-2013

Parent:  $^{223}\text{Ra}$ :  $E=0.0$ ;  $J^\pi=3/2^+$ ;  $T_{1/2}=11.43$  d 5;  $Q(^{14}\text{C})=31829$  3;  $\%^{14}\text{C}$  decay= $7.7\times 10^{-8}$  13

$^{223}\text{Ra}$ - $J^\pi, T_{1/2}$ : From Adopted Levels of  $^{223}\text{Ra}$ .

$^{223}\text{Ra}$ -[Additional information 1](#).

$^{223}\text{Ra}$ - $Q(^{14}\text{C})$ : deduced from masses in [2012Wa38](#) (evaluators).

$^{223}\text{Ra}$ - $\%^{14}\text{C}$  decay: Unweighted average of  $8.9\times 10^{-8}$  % 4 ([1995Ho11](#)) and  $6.4\times 10^{-8}$  % 4 ([1989Br34](#)).

[1989Br34](#):  $^{223}\text{Ra}$  activity from a thin and intense  $^{227}\text{Th}$  source. Measured  $^{14}\text{C}$  energies and intensities. Charged particles were detected by a semiconductor, FWHM=110 keV for  $^{14}\text{C}$ , FWHM=16-17 keV for  $\alpha$  particles. The energy scale was calibrated with a  $^{14}\text{C}$  beam scattered on a gold target and measured at  $\theta=30^\circ$ , which has the same energy as that of the  $^{14}\text{C}$  emitted by  $^{223}\text{Ra}$ .

[1995Ho11](#):  $^{223}\text{Ra}$  source was produced from the ISOLDE mass-separator. Charged particles were detected by a Si detector.

Measured  $\sigma$ . Deduced levels.

[1990Hu07](#) and [1990Hu02](#) have interpreted  $^{14}\text{C}$  emission in terms of a cluster formation mechanism, and calculated hindrance factors for the  $^{14}\text{C}$  groups that populate the g.s. and some low-lying excited levels in  $^{209}\text{Pb}$ . The low hindrance factors of 3.9 and 4.6 for the  $^{14}\text{C}$  groups that populate the 779- (configuration= $\nu(1i_{11/2})^{+1}$ ) and 1423-keV (configuration= $\nu(1j_{15/2})^{+1}$ ) levels in  $^{209}\text{Pb}$ , respectively, are consistent with the assignment of  $3/2+(-0.1,0.6)$  ( $3/2[631]$ ,  $3/2[761]$ ) to  $^{223}\text{Ra}$  g.s.. The Nilsson orbitals involved in this single-particle configuration also originate from the  $1i_{11/2}$  and  $1j_{15/2}$  spherical shells.

Others: [1992Ar02](#), [1991Ho15](#), [1990We01](#), [1985Al28](#), [1985Ku24](#), [1985Pr01](#), [1984Al34](#), [1984Ga38](#), [1984Ro30](#).

 $^{209}\text{Pb}$  Levels

E(level) <sup>†</sup>	$J^\pi$ <sup>‡</sup>	Comments
0.0	$9/2^+$	$E(^{14}\text{C})=29.8$ MeV 2 ( <a href="#">1985Ku24</a> ), $I(^{14}\text{C})=15$ 3 ( <a href="#">1989Br34</a> ), $Hf(^{14}\text{C})=583$ ( <a href="#">1990Hu07</a> ). Other: $I(^{14}\text{C})=18$ ( <a href="#">1995Ho11</a> ).
779	$11/2^+$	$E(\text{level})$ : from <a href="#">1989Br34</a> . $I(^{14}\text{C})=81$ 6 ( <a href="#">1989Br34</a> ), $Hf(^{14}\text{C})=3.9$ ( <a href="#">1990Hu07</a> ). Other: $I(^{14}\text{C})=82$ ( <a href="#">1995Ho11</a> ).
1423	$15/2^-$	$I(^{14}\text{C})=4.0$ ( <a href="#">1989Br34</a> ), $Hf(^{14}\text{C})=4.6$ ( <a href="#">1990Hu07</a> ).
1567	$5/2^+$	
2032	$1/2^+$	

<sup>†</sup> Rounded-off values from Adopted Levels.

<sup>‡</sup> From Adopted Levels.