

$^{188}\text{Po}$   $\alpha$  decay 2003Va16,1999An52

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 111,275 (2010)	1-Oct-2009

Parent:  $^{188}\text{Po}$ :  $E=0$ ;  $J^\pi=0^+$ ;  $T_{1/2}=0.28$  ms 5;  $Q(\alpha)=8082$  13;  $\% \alpha$  decay  $\approx 100.0$

$^{188}\text{Po}$ - $\% \alpha$  decay: Comparison of measured  $T_{1/2}$  with calculated  $\beta$  partial  $T_{1/2}$  of 1.0 s (1997Mo25) or  $\approx 0.8$  s (1973Ta30) implies negligible  $\varepsilon+\beta^+$  branch.

2003Va16:  $^{188}\text{Po}$  sources from  $^{142}\text{Nd}(^{50}\text{Cr},4n)$ ,  $E=5.04$  MeV/nucleon (mid-target); 99.8%  $^{142}\text{Nd}$  target; recoils separated by velocity filter SHIP and implanted into 16-strip position-sensitive Si detector; six Si detectors (for ce) and four-fold segmented Clover detector; measured  $E\gamma$ ,  $E\alpha$ ,  $I\alpha$ ,  $\alpha$ - $\gamma$  coin, parent  $T_{1/2}$ . Supersedes 2002VaZZ.

1999An52: source from  $^{142}\text{Nd}(^{52}\text{Cr},6n)$ ,  $E=288, 294$  MeV; measured  $E\alpha$ ,  $I\alpha$ ,  $\alpha$ -ce coin,  $T_{1/2}(184\text{PB})$ , recoil- $\alpha$ - $\alpha$  correlations.

2002VaZZ:  $^{188}\text{Po}$  from  $^{142}\text{Nd}(^{50}\text{Cr},4n)$ ; measured  $E\alpha$ ,  $T_{1/2}(184\text{PB})$ .

Parent  $T_{1/2}=0.28$  ms 3 (2003Va16; supersedes 0.30 ms 5 from 2002VaZZ); other values: 0.40 ms +20-15 and 0.20 ms +27-8 (1999An52). parent  $Q(\alpha)=8082$  13 from measured  $E\alpha=7910$  13 for g.s. to g.s. transition.  $\% \alpha(^{188}\text{Po}) \approx 100$  (only  $\alpha$  decay observed; see also comment on  $\alpha$  branching).

 $^{184}\text{Pb}$  Levels

E(level)	$J^\pi^\dagger$	Comments
0.0	$0^+$	
570 30	$(0^+)$	E(level): from difference In $E\alpha$ for $\alpha$ 's feeding this level and those feeding the ground state. very tentatively associated with $0^+$ prolate structures known In $^{186}\text{Pb}$ and $^{188}\text{Pb}$ (1999An52); however, a $0^+$ oblate state is also expected (based on systematics) At comparable energy, and the proximity of these states May result In highly mixed configurations.

$^\dagger$  From Adopted Levels.

 $\alpha$  radiations

$E\alpha$	E(level)	$I\alpha^\ddagger$	HF $^\ddagger$	Comments
7353 27	570	20 4	0.077 23	$E\alpha$ : weighted average of 7355 35 (2003Va16) and 7350 40 (1999An52). Correlated with $E\alpha=6620$ 20 (1999An52), $E\alpha=6606$ 20 (2003Va16) from $^{184}\text{Pb}$ decay. other $I\alpha$ : 35 20 (1999An52).
7911 13	0.0	80 4	1.0	$E\alpha$ : weighted average of 7915 25 (1999An52) and 7910 15 (2003Va16). Correlated with $E\alpha=6618$ 20 $\alpha$ 's from the $^{184}\text{Pb}$ daughter and with $E\alpha=6120$ 20 $\alpha$ 's from the $^{180}\text{Hg}$ granddaughter (1999An52). other $I\alpha$ : 65 20 (1999An52).

$^\dagger$  From 2003Va16.

$^\ddagger$   $r_0=1.486$  10 if HF=1 for 7911 $\alpha$  to g.s. and  $\% \alpha \approx 100$  for  $^{188}\text{Po}$ . However, HF to 577 level is then very much less than 1.0; HF $\geq 1$  implies  $I\alpha \leq 2\%$  to 577 level, very different from measured  $I\alpha=35\%$  20. Also,  $r_0$  is a little lower than expected from systematics ( $r_0(^{190}\text{Pb})=1.511$  6,  $r_0(^{188}\text{Pb})=1.511$  6 (1998Ak04);  $r_0(^{186}\text{Pb})=1.510$  2 (2003Ba44)). it should Be noted that, from systematics for even-A Pb isotopes, three low-lying  $0^+$  states are expected In  $^{184}\text{Pb}$  and their structures May Be strongly intermixed; also, the upper two states May have comparable energies, In which case  $\alpha$ 's feeding them May not have been resolved In the experiments of 1999An52 and 2003Va16.

$^\#$  For absolute intensity per 100 decays, multiply by  $\approx 1.0$ .

$^{188}\text{Po}$   $\alpha$  decay 2003Va16,1999An52 (continued) $\gamma(^{184}\text{Pb})$ 

$E_\gamma$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult.	Comments
570	570	(0 <sup>+</sup> )	0.0	0 <sup>+</sup>	(E0)	$E_\gamma$ : from level energy difference. Mult.: conversion electrons only are observed In coincidence with 7350 $\alpha$ (1999An52).

 $^{188}\text{Po}$   $\alpha$  decay 2003Va16,1999An52Decay Scheme