

**Adopted Levels, Gammas**

Type	History		Literature Cutoff Date
	Author	Citation	
Full Evaluation	Balraj Singh	ENSDF	31-Aug-2021

S(n)=8949 30; S(p)=1516 25; Q(α)=7694 15 [2021Wa16](#)

Q(ε)=8640 30, S(2n)=20390 40, S(2p)=1013 23, Q(εp)=9100 24 ([2021Wa16](#)).

[1999An52](#), [2001Hu21](#): <sup>189</sup>Po produced by <sup>142</sup>Nd(<sup>52</sup>Cr,5n), E=239-307 MeV, identified by the α-decay to the excited state of <sup>185</sup>Pb. Target: 290 μg/cm<sup>2</sup> <sup>142</sup>NdF<sub>3</sub> enriched to 99.8%. Velocity filter SHIP.

[2005An17](#): Cross section for production of <sup>189</sup>Po in heavy-ion reactions.

[2005Va04](#): activity produced by <sup>142</sup>Nd(<sup>52</sup>Cr,5n),E=5.27 MeV/nucleon; <sup>142</sup>Nd(<sup>50</sup>Cr,3n),E=5.04 MeV/nucleon; 99.8% enriched <sup>142</sup>Nd<sub>2</sub>F<sub>3</sub> target; Detectors: velocity filter (SHIP), 16-strip position sensitive silicon detector for α-particles; 6 silicon detectors for conversion electrons; four-fold segmented Clover detector for γ. Measured E(α), I(α), E(γ), αγ-coin, α(ce) coin, α<sub>tot</sub>.

Theoretical calculations: consult NSR database at [www.nndc.bnl.gov/nsr/](http://www.nndc.bnl.gov/nsr/) for 25 primary references for α decay, and three references (by the same author) on pre-scission neutron, proton, and α multiplicities in the fission process.

<sup>189</sup>Po Levels

Cross Reference (XREF) Flags

**A** <sup>193</sup>Rn α decay (1.15 ms)

E(level)	J <sup>π</sup>	T <sub>1/2</sub>	XREF	Comments
0	(5/2 <sup>-</sup> )	3.5 ms 5	<b>A</b>	%α≈100 ( <a href="#">2005Va04</a> ) %α: only α decay has been observed by <a href="#">2005Va04</a> (and <a href="#">1999An52</a> ) with Eα=7259 15, 7309 20 and 7532 20. In <a href="#">1999An52</a> , the possibility of an additional α decay from an additional isomeric level is mentioned, and based on a comparison with <sup>191</sup> Po, it was suggested that the decay energy and half-life should be similar to decay from the ground state. <a href="#">2005Va04</a> , from the same experimental group, presented potential energy surface calculations suggesting there should be only one state from which α decay can occur. Although this is referred to as an isomeric state, it is likely that what is meant is the ground state. J <sup>π</sup> : particle-plus-rotor model calculations produce a negative-parity prolate minimum for 7/2[514] configuration ( <a href="#">2005Va04</a> ). However, (5/2 <sup>-</sup> ) is supported by favored α decay to 278, (5/2 <sup>-</sup> ) state in <sup>185</sup> Pb which has possible configuration=ν5/2[512]. T <sub>1/2</sub> : from α decay curve ( <a href="#">2005Va04</a> ). Other: 5 ms 1 ( <a href="#">1999An52</a> ). <a href="#">2005Va04</a> and <a href="#">1999An52</a> are from the same group. The evaluators assume that half-life and α decay energies as reported in <a href="#">2005Va04</a> supersede those in <a href="#">1999An52</a> .
194	(3/2 <sup>-</sup> ,5/2 <sup>-</sup> ,7/2 <sup>-</sup> )		<b>A</b>	J <sup>π</sup> : (M1) γ to the (5/2 <sup>-</sup> ).

γ(<sup>189</sup>Po)

E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>γ</sub>	I <sub>γ</sub>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult.	α <sup>†</sup>	Comments
194	(3/2 <sup>-</sup> ,5/2 <sup>-</sup> ,7/2 <sup>-</sup> )	194	100	0	(5/2 <sup>-</sup> )	(M1)	1.69	α(K)=1.38; α(L)=0.24; α(M)=0.057; α(N)=0.0147; α(O)=0.00308; α(P)=0.000398 Mult.: from ce data in <sup>193</sup> Rn α decay ( <a href="#">2006An36</a> ) and prompt character of the transition.

<sup>†</sup> Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on γ-ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

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**Adopted Levels, Gammas****Level Scheme**

Intensities: Relative photon branching from each level

