

Lanthanides and Actinides Series Elements’ Level Table

Pranav Nalamwar and Dr.Jaideep Singh

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| <i>ElementAbbr.</i> | Element Name | Electron Config | Longest Lived Isotope | Half-Life(yr) | I | II | III | IV | V | VI | VII | VIII | IX | X |
|---------------------|--------------|--|-----------------------|----------------------------|-----|-----|-----|-----|----|----|-----|------|----|---|
| La | Lanthanum | [Xe]5 <i>d</i> ¹ 6 <i>s</i> ² | La-138 | 1.05 * 10 ¹¹ | 343 | 119 | 42 | 52 | 37 | 2 | 2 | 2 | 2 | 2 |
| Ce | Cerium | [Xe]4 <i>f</i> ¹ 5 <i>d</i> ¹ 6 <i>s</i> ² | Ce-144 | 7.7999 * 10 ⁻¹ | 953 | 491 | 227 | 17 | 12 | 4 | 2 | 2 | 2 | 2 |
| Pr | Praseodymium | [Xe]4 <i>f</i> ³ 6 <i>s</i> ² | Pr-143 | 3.71526 * 10 ⁻¹ | 430 | 201 | 430 | 104 | 9 | 2 | 2 | 2 | 2 | 2 |
| Nd | Neodymium | [Xe]4 <i>f</i> ⁴ 6 <i>s</i> ² | Nd-150 | 6.7 * 10 ¹⁸ | 739 | 840 | 31 | 19 | 2 | 2 | 2 | 2 | 2 | 2 |
| Pm | Promethium | [Xe]4 <i>f</i> ⁵ 6 <i>s</i> ² | Pm-147 | 2.6234 | 222 | 182 | 2 | 12 | 2 | 2 | 2 | 2 | 2 | 2 |
| Sm | Samarium | [Xe]4 <i>f</i> ⁶ 6 <i>s</i> ² | Sm-148 | 7 * 10 ¹⁵ | 501 | 377 | 58 | 24 | 2 | 2 | 2 | 2 | 2 | 2 |
| Eu | Europium | [Xe]4 <i>f</i> ⁷ 6 <i>s</i> ² | Eu-151 | 5 * 10 ¹⁸ | 592 | 163 | 118 | 13 | 2 | 2 | 2 | 2 | 2 | 2 |
| Gd | Gadolinium | [Xe]4 <i>f</i> ⁷ 5 <i>d</i> ¹ 6 <i>s</i> ² | Gd-152 | 1.8 * 10 ¹⁴ | 634 | 321 | 28 | 5 | 2 | 2 | 2 | 2 | 2 | 2 |
| Tb | Terbium | [Xe]4 <i>f</i> ⁹ 6 <i>s</i> ² | Tb-158 | 1.80 * 10 ¹ | 600 | 154 | 125 | 26 | 2 | 2 | 2 | 2 | 2 | 2 |
| Dy | Dysprosium | [Xe]4 <i>f</i> ¹⁰ 6 <i>s</i> ² | Dy-154 | 3 * 10 ⁶ | 740 | 576 | 2 | 13 | 2 | 2 | 2 | 2 | 2 | 2 |
| Ho | Holmium | [Xe]4 <i>f</i> ¹¹ 6 <i>s</i> ² | Ho-163 | 4.570 * 10 ¹ | 234 | 55 | 126 | 21 | 2 | 2 | 2 | 2 | 2 | 2 |
| Er | Erbium | [Xe]4 <i>f</i> ¹² 6 <i>s</i> ² | Er-169 | 2.7535 * 10 ⁻² | 634 | 362 | 53 | 10 | 2 | 2 | 2 | 2 | 2 | 2 |
| Tm | Thulium | [Xe]4 <i>f</i> ¹³ 6 <i>s</i> ² | Tm-171 | 1.91 * 10 ⁰ | 631 | 367 | 128 | 8 | 2 | 2 | 2 | 2 | 2 | 2 |
| Yb | Ytterbium | [Xe]4 <i>f</i> ¹⁴ 6 <i>s</i> ² | Yb-169 | 8.7682 * 10 ⁻² | 250 | 349 | 55 | 121 | 2 | 2 | 2 | 2 | 2 | 2 |
| Lu | Lutetium | [Xe]4 <i>f</i> ¹⁴ 5 <i>d</i> ¹ 6 <i>s</i> ² | Lu-176 | 3.78 * 10 ¹⁰ | 234 | 40 | 29 | 62 | 40 | 2 | 2 | 2 | 2 | 2 |
| Ac | Actinium | [Rn]6 <i>d</i> ¹ 7 <i>s</i> ² | Ac-227 | 2.1772 * 10 ¹ | 45 | 67 | 8 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Th | Thorium | [Rn]6 <i>d</i> ² 7 <i>s</i> ² | Th-232 | 1.405 * 10 ¹⁰ | 788 | 517 | 176 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Pa | Protactinium | [Rn]5 <i>f</i> ² 6 <i>d</i> ¹ 7 <i>s</i> ² | Pa-231 | 3.276 * 10 ⁴ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| U | Uranium | [Rn]5 <i>f</i> ³ 6 <i>d</i> ¹ 7 <i>s</i> ² | U-238 | 4.468 * 10 ⁹ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Np | Neptunium | [Rn]5 <i>f</i> ⁴ 6 <i>d</i> ¹ 7 <i>s</i> ² | Np-236 | 1.54 * 10 ⁵ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Pu | Plutonium | [Rn]5 <i>f</i> ⁶ 7 <i>s</i> ² | Pu-244 | 8.08 * 10 ⁷ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Am | Americium | [Rn]5 <i>f</i> ⁷ 7 <i>s</i> ² | Am-243 | 7.370 * 10 ³ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cm | Curium | [Rn]5 <i>f</i> ⁷ 6 <i>d</i> ¹ 7 <i>s</i> ² | Cm-247 | 1.56 * 10 ⁷ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Bk | Berkelium | [Rn]5 <i>f</i> ⁹ 7 <i>s</i> ² | Bk-247 | 1.380 * 10 ³ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Cf | Californium | [Rn]5 <i>f</i> ¹⁰ 7 <i>s</i> ² | Cf-251 | 8.98 * 10 ² | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Es | Einsteinium | [Rn]5 <i>f</i> ¹¹ 7 <i>s</i> ² | Es-252 | 1.2944 * 10 ⁰ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Fm | Fermium | [Rn]5 <i>f</i> ¹² 7 <i>s</i> ² | Fm-257 | 2.752 * 10 ⁻¹ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Md | Mendelevium | [Rn]5 <i>f</i> ¹³ 7 <i>s</i> ² | Md-258 | 1.4099 * 10 ⁻¹ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| No | Nobelium | [Rn]5 <i>f</i> ¹⁴ 7 <i>s</i> ² | No-258 | 1.1035 * 10 ⁻⁴ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Lr | Lawrencium | [Rn]5 <i>f</i> ¹⁴ 7 <i>s</i> ² 7 <i>p</i> ¹ | Lr-266 | 1.14155 * 10 ⁻³ | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

This table details the lanthanides and actinides,information regarding 10 of their charge states from NIST, electron configuration, and half-life. (Kramida, Yu. Ralchenko, Reader, & and NIST ASD Team, 2018)

References

Kramida, A., Yu. Ralchenko, Reader, J., & and NIST ASD Team. (2018). NIST Atomic Spectra Database (ver. 5.6.1), [Online]. Available: <https://physics.nist.gov/asd> [2018, December 22]. National Institute of Standards and Technology, Gaithersburg, MD.