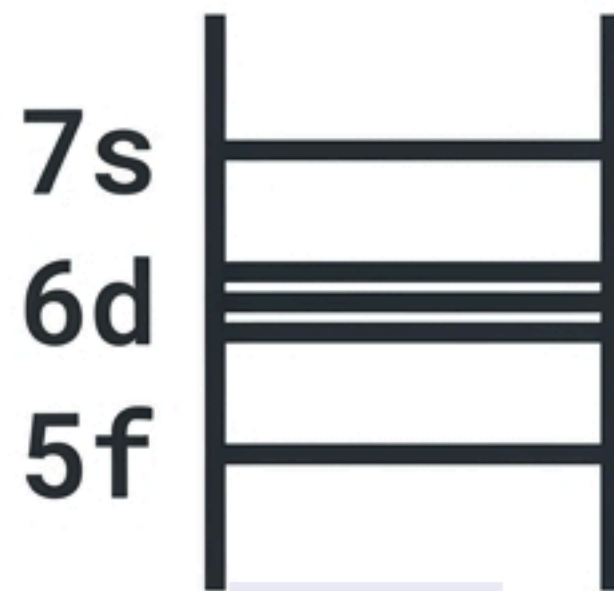


UNIT 4 • d- AND f-BLOCK ELEMENTS

Electronic Configurations of the Actinoids

TopAll



Comparable Energies

The defining physical truth of the actinoids:
the 5f, 6d, and 7s orbitals are nearly degenerate.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



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Key Highlights

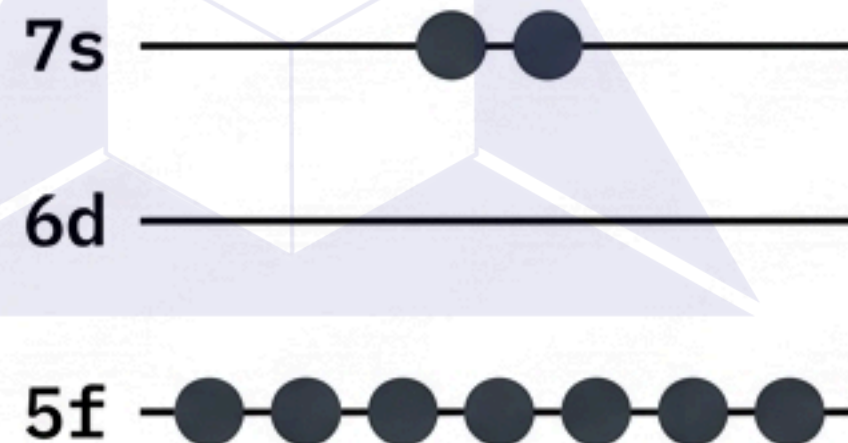
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Preserving the Half-Filled State

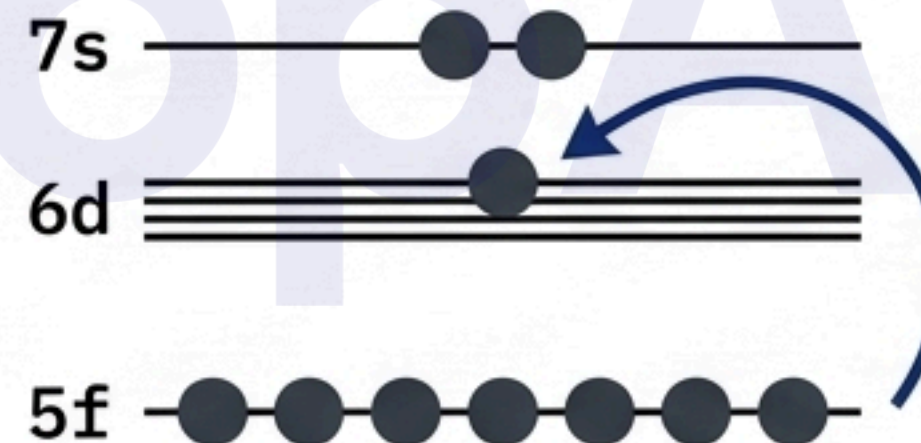


Americium (Z=95)



Stable $5f^7$ core.

Curium (Z=96)

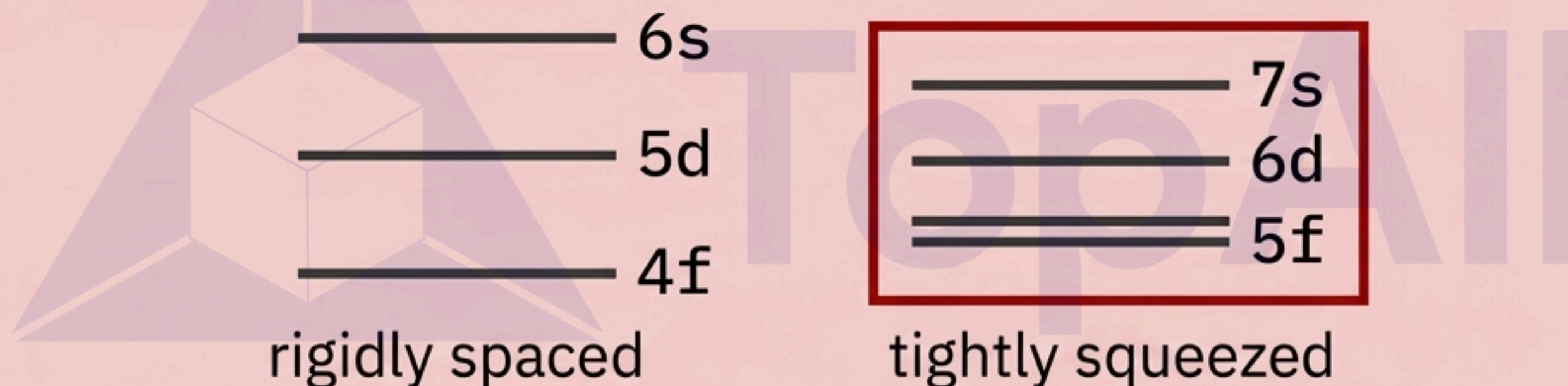


Pushes electron to 6d to maintain $5f^7$.



Watch for this heuristic trap

Do not assume actinoids fill the 5f subshell as sequentially and cleanly as lanthanoids fill 4f.



Because of this tight energy spacing, you must check actinoid configurations element by element. General rules will fail you here.

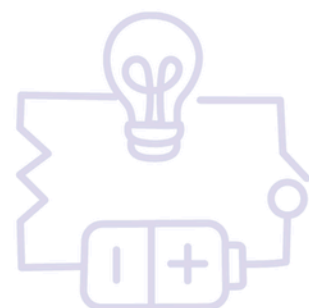
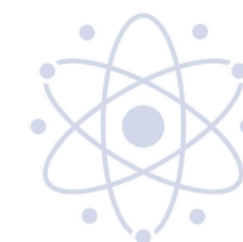
Key Takeaways

- The 5f, 6d, and 7s orbitals share highly comparable energies, creating a **tight ladder** where electrons easily shift between subshells.
- This proximity causes unpredictable configurations across the series, as elements will shift electrons into the 6d orbital to **preserve stable half-filled ($5f^7$)** or fully filled ($5f^{14}$) states (e.g., Curium).



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