Competition Corner: Nuclear Model Bounds

g10_u08_w29

Use only printed notation cards. Conserve mass and atomic number, state the named decay-model pattern, and do not translate a paper equation into an exposure, medical, energy-policy, safety, or experimental claim.

1. A card gives ${}^{210}_{84}\mathrm{Po} \rightarrow {}^{206}_{82}\mathrm{Pb} + {}^{\mathrm{A}}_{\mathrm{Z}}\mathrm{X}$. Find A and Z for the emitted particle and identify the model pattern.

2. For ${}^{32}_{15}\mathrm{P} \rightarrow {}^{32}_{16}\mathrm{S} + {}^{0}_{-1}\mathrm{e}$, check mass and atomic-number conservation and identify the printed beta-minus pattern.

3. A gamma card starts with ${}^{99}_{43}\mathrm{X}$ and emits γ. State the printed A and Z changes and one fact the notation still does not give.

4. Critique: "If two nuclides have the same mass number, they must have the same element identity and stability."

5. List two categories of information needed before a paper nuclear-notation card could support a safety, medical, experimental, or energy-policy decision.