

Isotopes

Things at the “same place” in the periodic table

An element is all of the atoms with the same number of protons (e.g., 92 for uranium). Within one element, isotopes are atoms with different numbers of neutrons (e.g., 142, 143, and 146 for uranium), which give the different weights by which the isotopes are known (e.g., 234, 235, and 238 for uranium). When chemists were first learning about all of this and assembling the periodic table, they realized that isotopes of an element were all things that should be at the same place in the periodic table, and “same place” (or “iso - tope” from Greek) gave the name “isotope”.

Stacked cards representing Lead isotopes. The top card is for mass number 208 (82 protons, 126 neutrons). Below it are cards for 207 (82 protons, 125 neutrons), 206 (82 protons, 124 neutrons), and 204 (82 protons, 122 neutrons). The bottom-most card is the largest and contains the element symbol 'Pb', 'Element No. 82', and the name 'Lead'.

Stacked cards representing Thorium isotopes. The top card is for mass number 234 (90 protons, 144 neutrons). Below it are cards for 232 (90 protons, 142 neutrons), 231 (90 protons, 141 neutrons), and 230 (90 protons, 140 neutrons). The bottom-most card is the largest and contains the element symbol 'Th', 'Element No. 90', and the name 'Thorium'.

Stacked cards representing Uranium isotopes. The top card is for mass number 238 (92 protons, 146 neutrons). Below it are cards for 235 (92 protons, 143 neutrons) and 234 (92 protons, 142 neutrons). The bottom-most card is the largest and contains the element symbol 'U', 'Element No. 92', and the name 'Uranium'.