

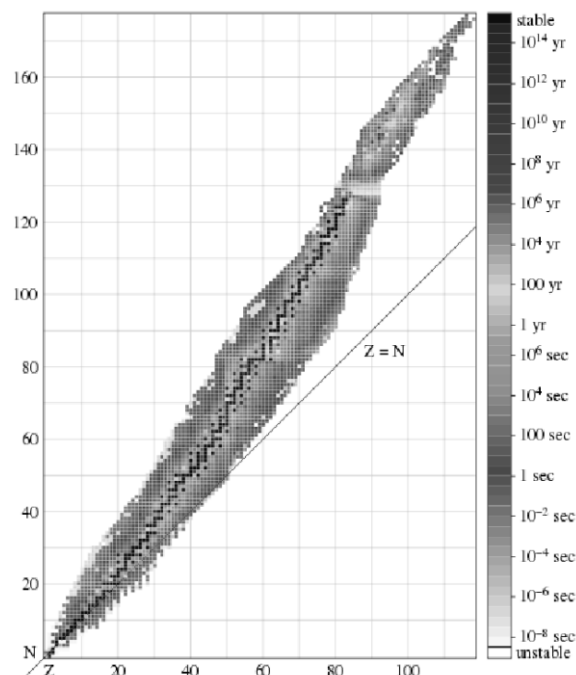
Exercise 2.6 Stability of Isotopes

Band of Stability Graph (on data sheets of all CHEM 1000 tests)

The graph at the right shows the band of stability. Stable isotopes are in black. Isotopes that exist but are not stable are shown in varying shades of gray with the shades of gray corresponding to different half-lives.

The original version of the graph used a rainbow colour scale (see next page).

http://commons.wikimedia.org/wiki/File:Isotopes_and_half-life_eo.svg



1. Explain why each of the statements below is true.
 - (a) ^1H is the only stable isotope which contains no neutrons.
 - (b) There are no stable isotopes with $Z > 82$.
 - (c) Beta decay reduces N/Z .
 - (d) Positron emission increases N/Z .
 - (e) Alpha decay increases N/Z .

2. Use the band of stability graph to classify each of the following isotopes as stable, unstable or non-existent (i.e. never made). Mark where each isotope can be found on the graph.

(a) ^{10}Ne	(b) ^{20}Ne	(c) ^{30}Ne
(d) ^{80}Zr	(e) ^{210}Th	(f) ^{235}Th

3. For each of the unstable isotopes in question 2, identify the most likely mode(s) of decay.

Original (coloured) image for band of stability graph.

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