Announcements

To join clicker to class today (Clickers with LCD display joins automatically):

- Turn on the Clicker (the red LED comes on).
- Push "Join" button followed by "20" followed by the "Send" button (switches to flashing green LED if successful).

- Chem Club should be selling goggles in the common area between lecture pits after class today.

" Lab next week is *Line Spectra and Significant Digits*. THERE IS A PRELAB YOU MUST HAVE COMPLETED WHEN YOU COME TO LAB NEXT WEEK. Watch for the lab handout on the e-mail discussion list or download it from the class web site.

" Exam 1 a week from today.

Samples of exams 1 & 2 from last year are available on class web site in the Study-Aids section.

All other review material (answer keys and notes on end of chapter review material) will be posted in next day or so.

Review

- Overview of periodic trends.
- Mass spectrometry. (Charged particles follow different curved paths in a magnetic field depending upon m/z)
- Isotopes and average atomic mass.

  Example H + D:

  1.007825(0.99985)+2.014108(0.00015) = 1.0080 amu

  $= m_H f_H + m_D f_D = m_{avg}$
- Writing nuclear reactions. (sum of mass #'s on lhs = sum of mass #'s on rhs, same for sum of charges)
- Fusion in stars converting the H produced after the Big Bang into heavier elements.

Chang Fig. 21.2

Cartoons of Radioactive Decay

1. Alpha decay: ${}^{m}_{p}X$ ---> ${}^{4}_{2}\alpha$(expelled) + ${}^{m-4}_{p-2}Y$
2. β decay: n (in nucl) —> p (in nucl) + ${}^{0}_{-1}e$ (expelled)
3. positron emission, p (in nucl) ---> n(in nucl) + ${}^{0}_{1}e$ (expelled)
4. electron capture, p (in nucl) + ${}^{0}_{-1}e$(falls in) --> n (in nucleus)

Band of Stability

" Isotopes above the band of stable isotopes (green) undergo β decay to decrease n:p ratio.

- isotopes below band of stable isotopes undergo electron capture or positron emission to increase n:p
- Those out beyond the band of stable isotopes (heavier than $^{209}_{83}Bi$) are all radioactive and also undergo α decay to lose both n and p

Chang 21.1

Geiger Counter

Chang Fig. 21.18