Radioactivity Quiz

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Warm-up problems

1. Which type of radioactive emission
   (a) is positively charged?
   (b) is not deflected by magnetic fields?
   (c) is the most penetrative?
   (d) is the most intensely ionizing?
   (e) cannot pass through cardboard?
   (f) does not cause a change in mass number or atomic number?
   (g) has the greatest mass?
2. Uranium-235 and uranium-238 are isotopes of uranium, and they both have the proton number 92.
   (a) What do the numbers 235 and 238 represent?
   (b) What does 92 tell you about the nucleus of uranium?
   (c) How are the two isotopes different?
   (d) Uranium has 92 protons. How many neutrons are there in uranium-235 and uranium-238?
   (e) How many electrons are there in an atom of uranium?
3. All the parts of this question are multiple choice.
   (a) The rate of radioactive decay can be increased by increasing the
   A temperature B pressure C light intensity D none of these
   (b) An alpha particle has a charge of
   A +1 B +2 C −1 D +4 E none of these
   (c) A beta particle is
   A a helium nucleus B an electron from the nucleus C electromagnetic radiation D none of these
4. Complete the following equations for radioactive decay:
   (a) Radon gas decays via α decay:
   $$^{222}_{86}\mathrm{Rn} \longrightarrow {}^{4}_{2}\alpha +$$
   (b) Iron-59 is an unstable isotope of iron which decays via β emission:
   $$^{59}_{26}\mathrm{Fe} \longrightarrow$$

Extension problems

5. Paul says 'an ion is a bit like an isotope, it has one two few or one too many particles'. Explain whether Paul is right in thinking this, and how could you improve his understanding?