College Prep Chemistry of the Earth System

Assignment 3K 20 Points

Atomic Stability and Z-Ratio

Answer the following questions

1. *Review*: What is the role of the following particles in the atom?
    a. protons (p^+)
    b. electrons (e^-)
    c. neutrons (n^o)
2. In general, what makes an isotope of an element unstable? Explain!
3. Calculate the z-ratio for the following atomic isotopes. For each isotope is the atom stable (*compare mass number to average atomic mass*)
    a. $^{24}_{12}Mg$ c. $^{54}_{26}Fe$
    b. $^{81}_{35}Br$ d. $^{137}_{56}Ba$
4. For the following isotopes determine the z-ratio for each isotope. Given the *stable z-ratio* which isotope is most stable?
    a. Potassium (K), Stable = 1:1.05
        a. $^{39}_{19}K$ Potassium-39
        b. $^{40}_{19}K$ Potassium-40
        c. $^{41}_{19}K$ Potassium-41
    b. Silicon (Si), Stable z-ratio = 1:1.00
        a. $^{28}_{14}Si$ Silicon-28
        b. $^{29}_{14}Si$ Silicon-29
        c. $^{30}_{14}Si$ Silicon-30