

Workbook



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Periodic Table and Atomic Properties

Sizes of Atoms and Ions

Questions

- 1) Indicate the atom with the larger radius:
 - a. Cl or Se
 - b. Na or Mg
 - c. Rb or Mg
 - d. Si or Sn
 - e. In or S

- 2) Which is the largest atom in period 5 and the smallest atom in group 2?

- 3) Arrange the atoms in order of increasing radius:
O, P, Sr, Rb

- 4) Indicate the atom or ion with the larger size:
 - a. K or K^+
 - b. Cl or Cl^-
 - c. K^+ or Ca^{2+}
 - d. Br^- or Se^{2-}
 - e. Br^- or Rb^+

- 5) Give one example of an isoelectronic pair of:
 - a. two different cations
 - b. two different anions
 - c. a cation and an anion

Answer Key

- 1) a. Se
b. Na
c. Rb
d. Sn
e. In
f. $n = 5$
- 2) The largest atom in period 5 is Rb and the smallest atom in group 2 is Be.
- 3) $O < P < Sr < Rb$
- 4) a. K
b. Cl^-
c. K^+
d. Se^{2-}
e. Br^-
- 5) a. K^+ , Ca^{2+}
b. Br^- , Se^{2-}
c. K^+ , Cl^-

Losing or Gaining Electrons

Questions

1) Arrange the following in order of decreasing ionization energy:

Ge, Fr, Ba, N, Sn

2) How much energy must be absorbed to convert 200 mg of Mg to Mg⁺?

The first ionization energy of Mg equals 737.7 kJ mol⁻¹.

3) How much energy is required to remove all the third shell electrons in 3 moles, of gaseous aluminum atoms?

$$I_1(\text{Al}) = 577.6 \frac{\text{kJ}}{\text{mol}}, I_2(\text{Al}) = 1817 \frac{\text{kJ}}{\text{mol}}, I_3(\text{Al}) = 2745 \frac{\text{kJ}}{\text{mol}}$$

4) How many Na⁺ ions can be produced per kJ of energy absorbed by a sample of, gaseous Na atoms?

$$I_1(\text{Na}) = 495.8 \frac{\text{kJ}}{\text{mol}}$$

Answer Key

1) N > Ge > Sn > Ba > Fr

2) 6.07 kJ

3) 15,418.8 kJ

4) $1.21 \cdot 10^{23} \frac{\text{ions}}{\text{kJ}}$