

PRACTICE: ELECTRON CONFIGURATIONS

- (a) Draw the energy-level diagram, write the full electron configuration, and write the shorthand electron configurations for the atom of each of the following elements: P Ga Ru Al Cd S Se

(b) Repeat (a) for the common ion of each element listed.
- Oxygen ions, fluoride ions, neon atoms, sodium ions, and magnesium ions are isoelectronic. Write the full electron configuration for each, and explain what is meant by *isoelectronic*.
- The actual shorthand electron configuration for palladium is Pd:[Kr]4 d^{10} .
 - Give the predicted shorthand electron configuration for palladium based on the rules.
 - Explain this anomaly.
- Copper is paramagnetic but zinc is not paramagnetic. Explain this observation using electron configurations.
- Which groups of elements listed below would you expect are not paramagnetic. Explain why.
alkali metals, alkaline earth metals, halogens, noble gases
- Use electron configurations to explain the following ionic charges.
(a) Na⁺ (b) S²⁻ (c) Ga³⁺ (d) Ru³⁺ (e) Ag⁺ (f) Sc³⁺ (g) Zn²⁺
- Carbon, the basis of organic chemistry (our next unit of study), always forms four covalent bonds. Illustrate using energy-level diagrams how electron promotion allows carbon to form four bonds.
- Oxygen can only form two covalent bonds (e.g., OF₂) yet sulfur, which is in the same group as oxygen, can also form four or six covalent bonds (e.g., SF₂, SF₄, SF₆). Explain/illustrate this difference between oxygen and sulfur based on electron configurations.