

5-3 Review and Reinforcement

Periodic Trends

Use the periodic table and your knowledge of periodic trends to answer the following questions.

Which atom in each pair has the larger atomic radius?

- K 1. Li or K
Ca 2. Ca or Ni
Ga 3. Ga or B
C 4. O or C
Br 5. Cl or Br
Ba 6. Be or Ba
Si 7. Si or S
Fe ~~8. Fe or Au~~ *

Which ion in each pair has the smaller atomic radius?

- K⁺ 9. K⁺ or O²⁻
Ba²⁺ 10. Ba²⁺ or I⁻
Al³⁺ ~~11. Al³⁺ or P³⁻~~ *
K⁺ 12. K⁺ or Cs⁺
Fe³⁺ 13. Fe²⁺ or Fe³⁺
F⁻ 14. F⁻ or S²⁻

Which atom or ion in each pair has the larger ionization energy?

- O 15. Na or O
Be 16. Be or Ba
F 17. Ar or F
Cu 18. Cu or Ra
Ne 19. I or Ne
V 20. K or V
Ca 21. Ca or Fr
Se 22. W or Se

5-3 Review and Reinforcement (continued)

Write the charge that each of the following atoms will acquire when it has a complete set of valence electrons.

- 2- 23. O
- + 24. Na
- 25. F
- 3- 26. N
- 2+ 27. Ca
- 0 28. Ar

29. Define atomic radius.

distance from center of nucleus to outermost electron.

30. Why do atoms get smaller as you move across a period?

more protons leads to stronger attractive forces, pulling outermost electrons closer

31. Explain the relationship between the relative size of an ion to its atom and the charge on the ion.

+ ions smaller than atom
- ions larger than atom

~~32. Contrast ionization energy and electron affinity. In general, what can you say about these values for metals and nonmetals?~~

~~33. Why is there such a large jump in ionization energy between the second and third ionization energies for magnesium?~~

34. Explain why noble gases are inert and do not form ions.

they have complete outermost energy levels

35. Define the term electronegativity. What is the periodic trend for electronegativity?

- how strongly atom attracts electrons in bond
- increases as you go up and right

Appendix 6: Electronegativities (BLM)

Use the table of electronegativities to determine the bond type (ionic, polar covalent, non-polar covalent) that would be formed between each of the following elements. Provide the electronegativity difference for each pair.

	<u>Bond Type</u>	<u>Electronegativity Difference</u>
1. Na, Cl	ionic	$3.0 - 0.9 = 2.1$
2. Al, Cl	polar covalent	$3.0 - 1.5 = 1.5$
3. H, S	nonpolar covalent	$2.5 - 2.1 = 0.4$
4. K, F	ionic	$4.0 - 0.8 = 3.2$
5. O, O	nonpolar covalent	$3.5 - 3.5 = 0$
6. Mg, S	polar covalent	$2.5 - 1.2 = 1.3$
7. Li, Br	polar covalent	$2.8 - 1.0 = 1.8$
8. F, F	nonpolar covalent	$4.0 - 4.0 = 0$

