

### Effective Nuclear Charge

$Z_{\text{effective}} < Z_{\text{actual}}$  b/c  $Z_{\text{effective}}$  also accounts for repulsion of an electron by other electron

$$Z_{\text{effective}} = Z - S$$

electrons in the same shell do not screen but repel each other

#### EXAMPLE



$$11^+ \{\text{number of protons}\} - 10 \{\text{number of electrons in Ne core}\} = 1^+ \{\text{effective nuclear charge of the 3s valence electron}\}$$

### Ionization Energy

ionization energy = minimal energy needed to remove an electron from a neutral atom

first ionization = energy required to remove first electron



second ionization = energy required to remove second electron



the greater the ionization energy, the more difficult to remove the electron

moving from left to right, ionization values increase

ionization values decrease from top to bottom

### Size of Atoms

electron clouds of colliding atoms cannot penetrate each other to any significant extent

nonbonding atomic radius > bonding atomic radius

**why is bonding atomic radius 0.5d?**

bonding atomic radius increases from top to bottom of table

bonding atomic radius decreases from left to right

### Electron Configurations

when electrons are removed from an atom to form a cation, they are removed from orbitals with the largest n value

when electrons are added to an atom, they are added to the orbitals with the lowest n value

### Size of Ions

cations are smaller than the parent atom

anions are bigger than parent atom

**is there a trend for ion size in the periodic table?**

### Electron Affinity

electron affinity = measurement of attraction of the atom for the added electron

**how is affinity measured?**

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### Notes/Questions

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