

IONIC BONDS AND OTHER ELEMENTS

- Group 1A elements (sodium, lithium) readily lose 1 electron to form a cation that now has similar properties to a noble gas
- Group 2A elements (calcium, magnesium) readily lose 2 electrons for the same purpose
- Group 7A elements (fluorine, chlorine) readily gain 1 electron to form an anion that now has similar properties to a noble gas

Study Table 6.1 on page 188

- Basically, atoms that are not noble gases will either gain or lose 1-3 electrons in order to have same number of electrons as noble gases.
- Group 1, 2, 3 elements will lose 1-3 electrons
- Group 5, 6, 7 elements will gain 1-3 electrons
- Group 8 will neither gain nor lose electrons because they are the 1st and 2nd most stable elements

In-Class example

Ga: (Ar) $4s^2 3d^{10} 4p^1$ subtract(-) 3 electrons = Ga³⁺: (Ar) $3d^{10}$

NOTICE: eliminate s orbital and p orbital before subtracting electrons from the d orbital

- Atomic Radii: increases left and down
- Cations have a smaller radii than their neutral atoms
- Anions have a larger radii than their neutral atoms
- Ionization Energy: The amount of energy necessary to remove the highest-energy electron from an isolated neutral atom in the gaseous state
- Ionization energy increases up and right

clicker:

1. From which orbital is the electron removed when a Na⁺ cation is formed?
Ans: 3s
2. Electron configurations of ions commonly correspond to electron configurations of?
Ans: noble gases
3. What electrons do most nd metals lose to form a 2+ cation?
Ans: 2 electrons from the (n+1)s subshell
4. One reason why cations are smaller than the neutral atoms they originate from is?
Ans: remaining electrons feel larger Z_{eff} (effective nuclear charge)