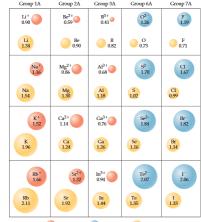


Ch. 7.3 Periodic trend in ionic radius

In a row, left → right, for cation / anion
atomic & ionic size: decreases

In column, top → bottom,
atomic & ionic size: increases

Relative size of ion versus corresponding atom
cation < atom
anion > atom

source: https://sites.lpu.org/spotnam/IHS_ISBChemistry/Chemistry_Brown_12th.pdf

Rationale / basis: periodic trend in size of ion similar to atomic size rationale / basis

In a row, left → right: ionic size decreases
for cations,

increase Z → increase Z_{eff} → increase F_{attr} → decrease ion size
same S (i.e. isoelectronic = same # electrons; recall, $Z_{\text{eff}} = Z - S$)

for anions,
increase Z → increase Z_{eff} → ...
same S

In column, top → bottom: ionic size increases
get additional shell of electrons → increase ion size

Rationale / basis: relative size of ion versus atom

for atom versus corresponding cation,
remove electron → reduce S → increase Z_{eff} → increase F_{attr} → decrease ion size
same Z

for atom versus corresponding anion,
add electron → raise S → decrease Z_{eff} → decrease F_{attr} → increase ion size
same Z
or increase electron – electron repulsion → increase ion size

1

2

3

**Isoelectronic species: same number of electrons**

→ Increasing nuclear charge →
O²⁻ F⁻ Na⁺ Mg²⁺ Al³⁺
1.26 Å 1.19 Å 1.16 Å 0.86 Å 0.68 Å
→ Decreasing ionic radius →

protons: 8 9 11 12 13
electrons: 10 10 10 10 10

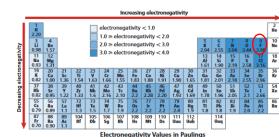
That is,
increase Z → increase Z_{eff} → increase F_{attr} → decrease ion size
same S

recall: $Z_{\text{eff}} = Z - S$

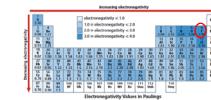
Periodic trend in electronegativity (EN)

electronegativity: how much an atom “wants” another atom’s electrons ?

Periodic trend deducible by remembering that F (fluorine) is the most electronegative atom

**continue**

Based on knowing that F is the most electronegative atom,



source: <http://documents.site/glencoe-chemistry-matter-and-change.html>
deduce,

In a row, left → right: increase in EN ; vice versa

In a column, bottom → top: increase in EN ; vice versa

Basis / rationale: too “complicated”

4

5

6

