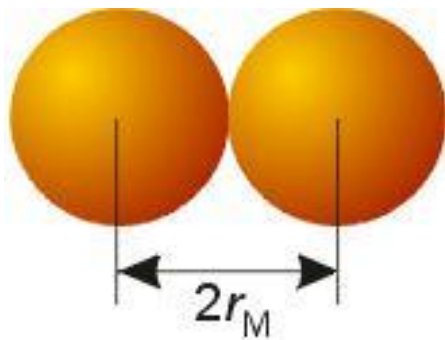


# Concepts for the Radius of the Spheres

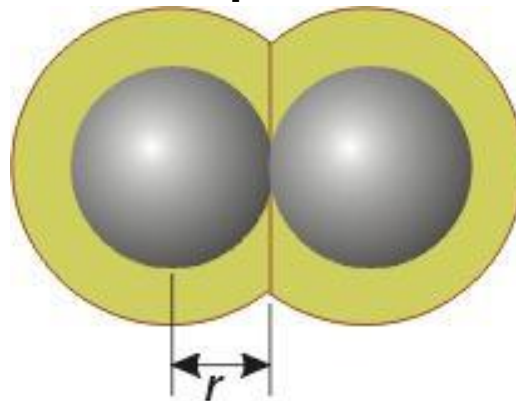
elements or  
compounds („alloys“)



1 Metallic radius

=  
d/2 in metal

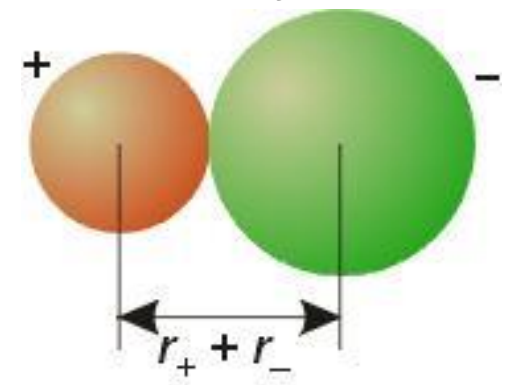
element or  
compounds



2 Covalent radius

=  
d/2 of single bond  
in molecule

compounds  
only

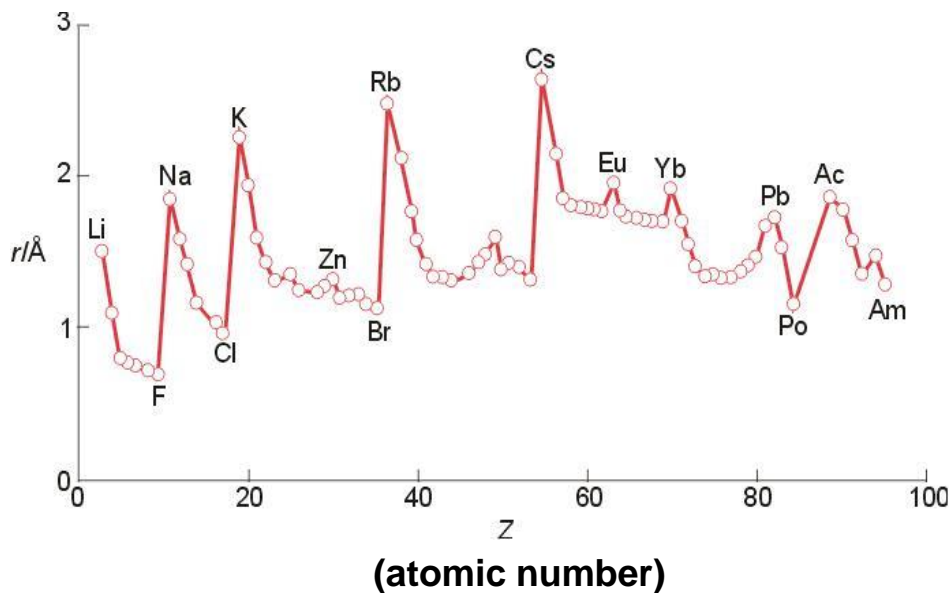


3 Ionic radius

=  
d - r(F, O...)  
problem: reference!

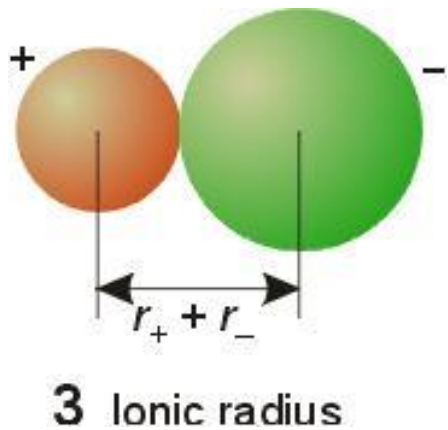
# Trends for the Radius of the Spheres

- atomic radii increase on going down a group.
- atomic radii decrease across a period
- particularities: Ga < Al (d-block)
- ionic radii increase on going down a group
- radii of equal charge ions decrease across a period
- ionic radii increase with increasing coordination number
- the ionic radius of a given atom decreases with increasing charge
- cations are usually smaller than anions

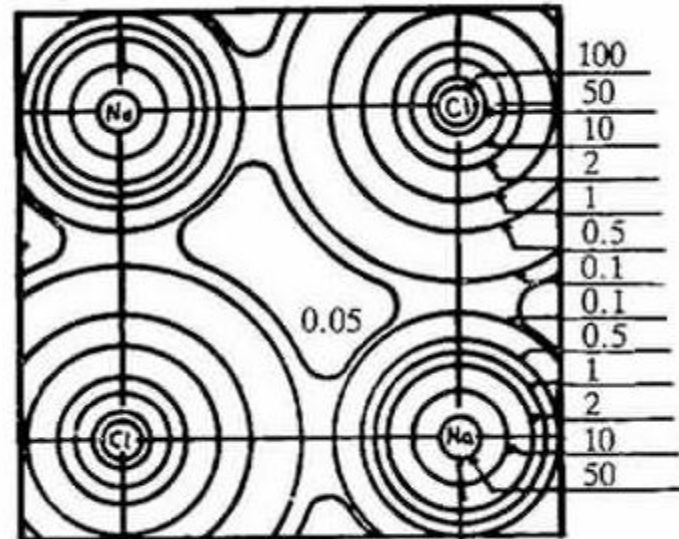


# Determination of the Ionic Radius

Ionic radius =  $d - r(\text{F, O...})$



Structure analyses while the most important method is x-ray diffraction (here: NaCl)



Linus Pauling:

- Radius of one ion is fixed to a reasonable value ( $r(\text{O}^{2-}) = 140 \text{ pm}$ )
- That value is used to compile a set of self consistent values for other ions.