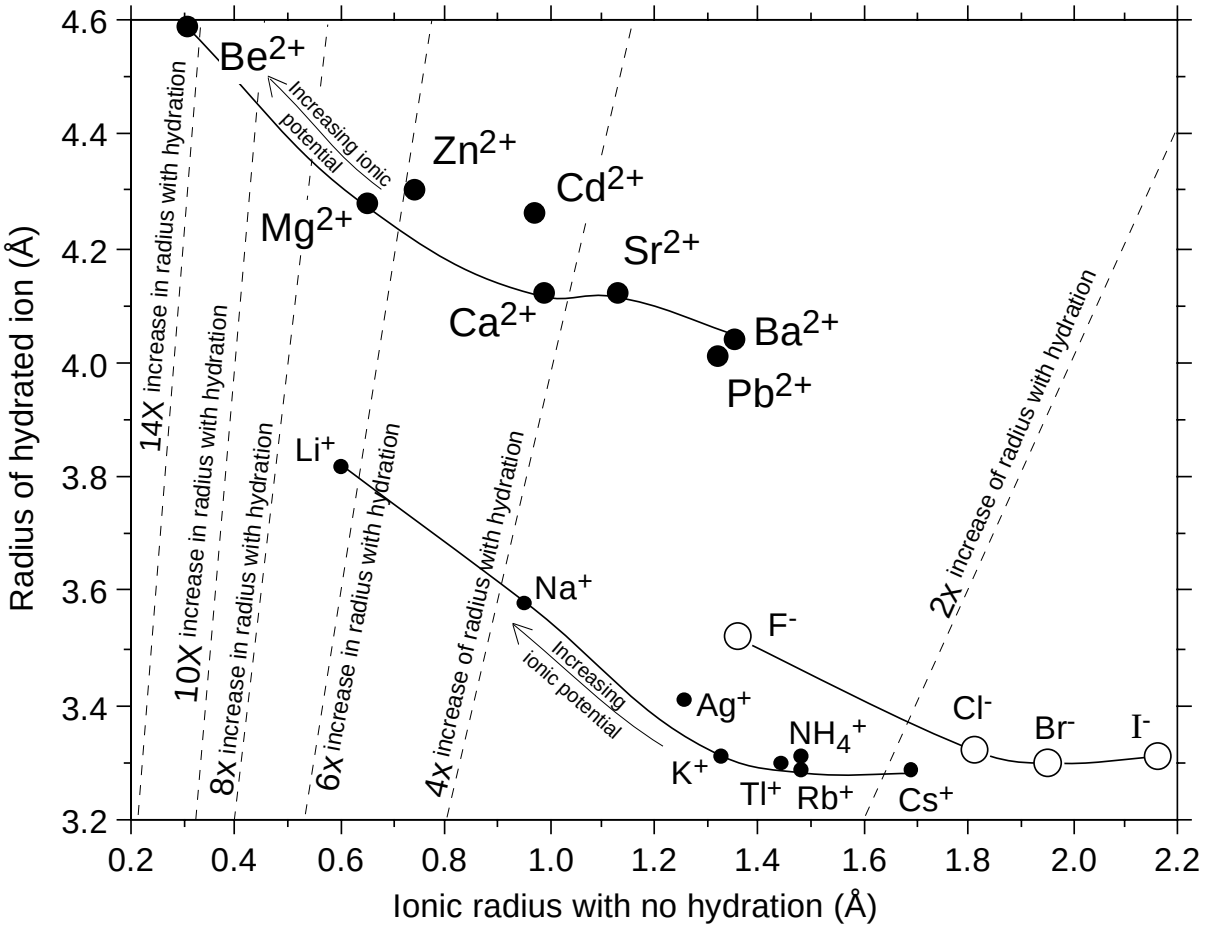
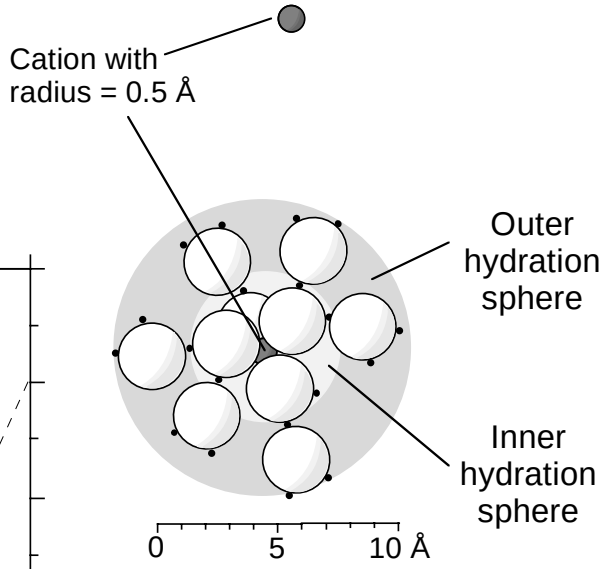
Variation in hydrated radius of ions

Hydration of an ion depends on the electrostatic attraction of water molecules to that ion. Because attraction of water molecules around an ion depends on that ion's density of charge, smaller ions (and thus ions of greater ionic potential) attract more water molecules. The result is the *inverse* relationship between non-hydrated radius and hydrated radius shown below.





One must appreciate that published radii of hydrated ions are statistical statements about a population of ions, each of which may change in extent of hydration through very short time scales. Thus the values plotted at left are averages through time of the hydrated radius of many individuals and are unlikely to equal the radius of the ion plus some multiple of 1.4Å, the radius of O^{2-}.

Source of data: Conway, 1981, *Ionic Hydration in Chemistry and Biophysics,* as in Dove & Nix, 1997, *Geochimica et Cosmochimica Acta,* v. 61, p. 3331.