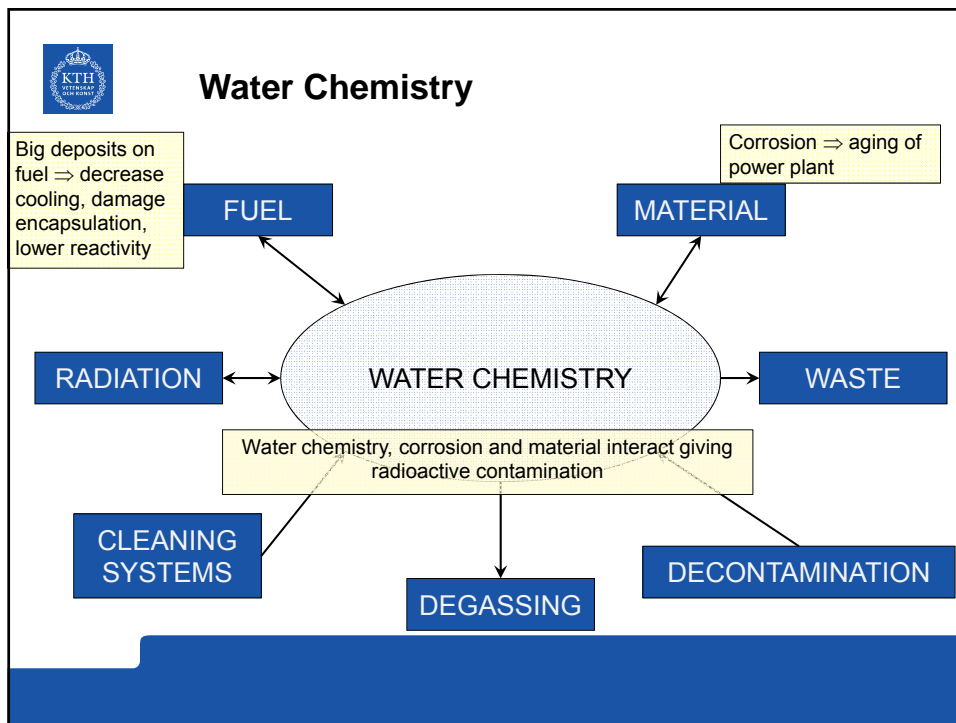
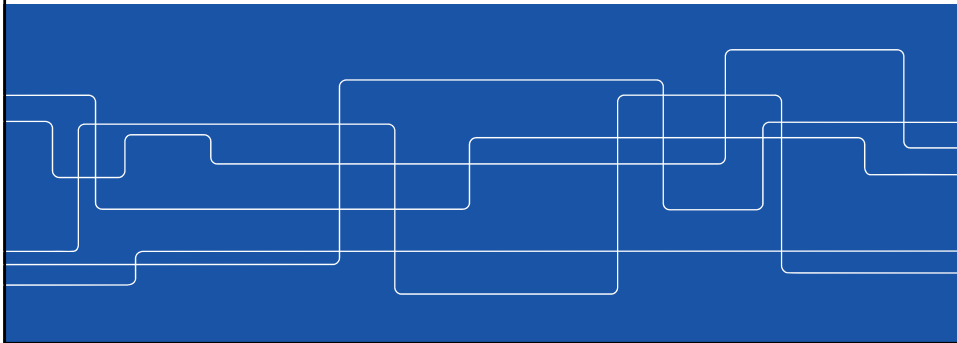
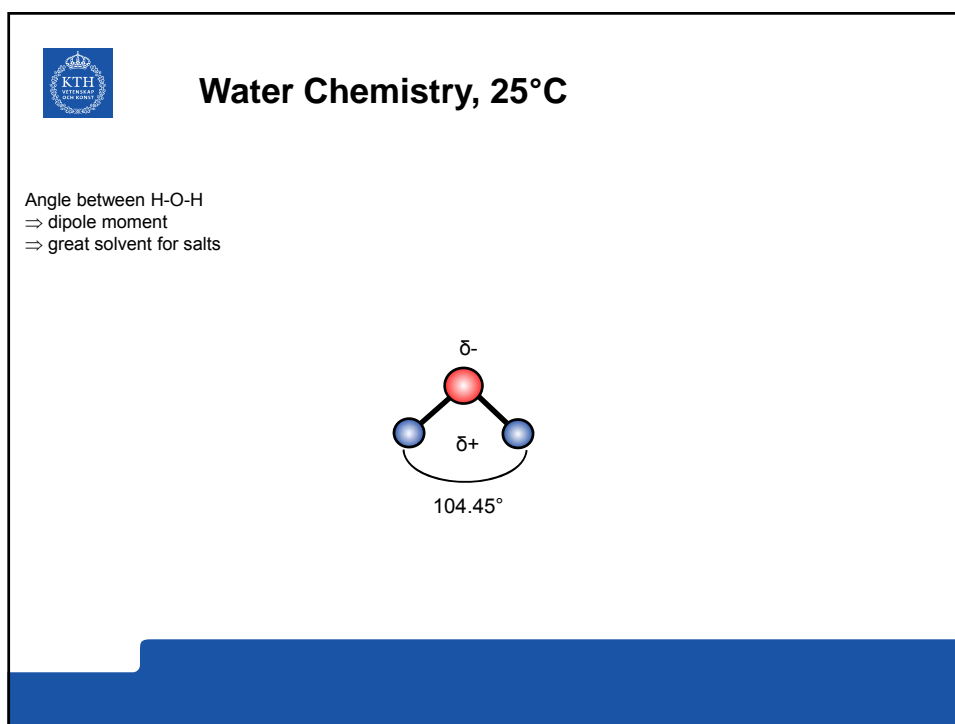
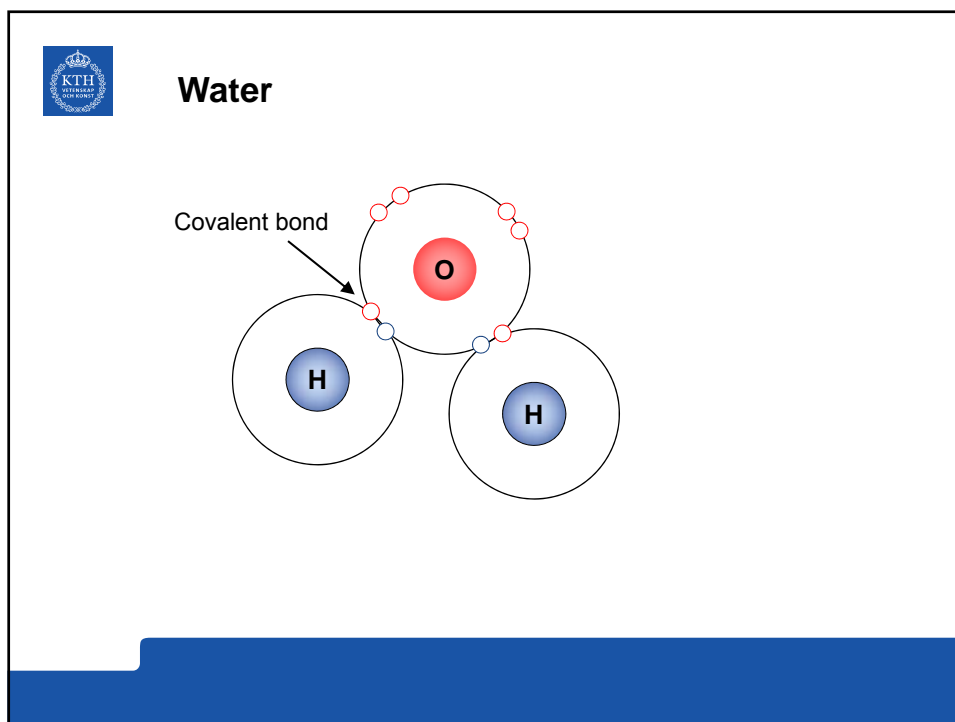





Reactor Chemistry

Water Chemistry





 **Water Chemistry, 25°C**

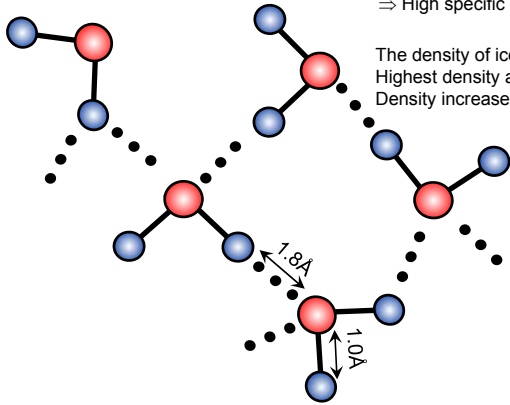
Angle between H-O-H
 ⇒ dipole moment
 ⇒ great solvent for salts

Hydrogen bonds
 between molecules
 ⇒ high boiling point
 (no H-bonds Bp=-100°C)


Addition of acid increases
 conductivity greatly since
 H⁺ can easily "jump" through
 the structure (and so can OH⁻)

Heat can be stored in the hydrogen
 bonds as potential vibration energy
 ⇒ High specific heat capacity

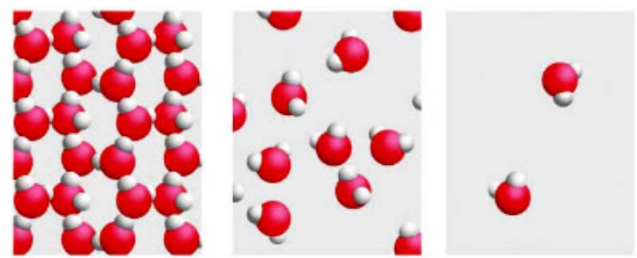
The density of ice is lower than water
 Highest density at +4°C (1 atm)
 Density increase with incr. pressure



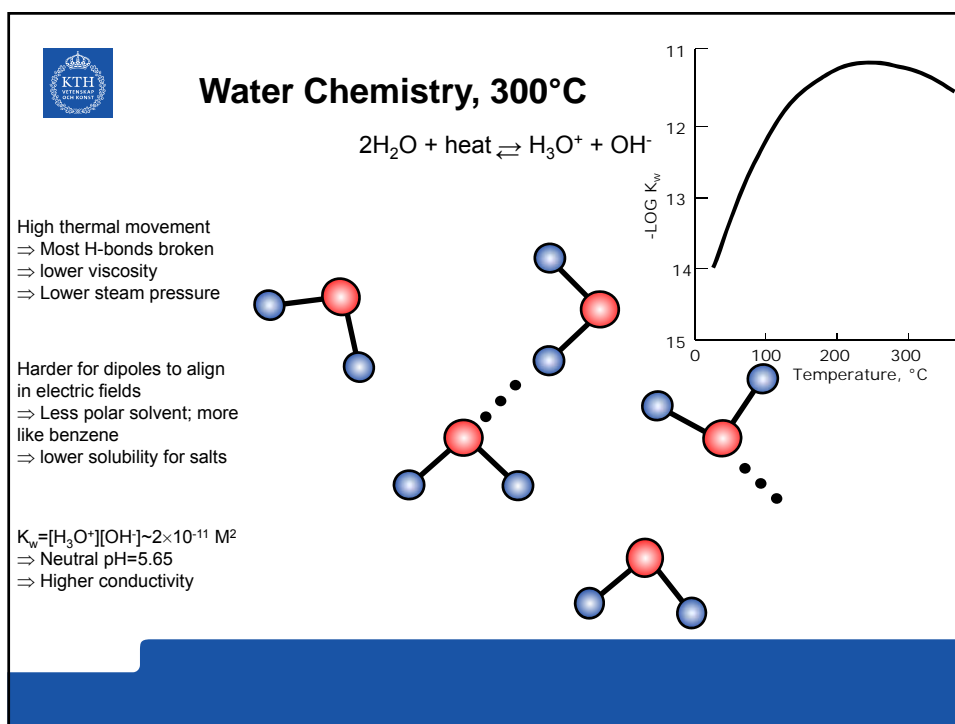
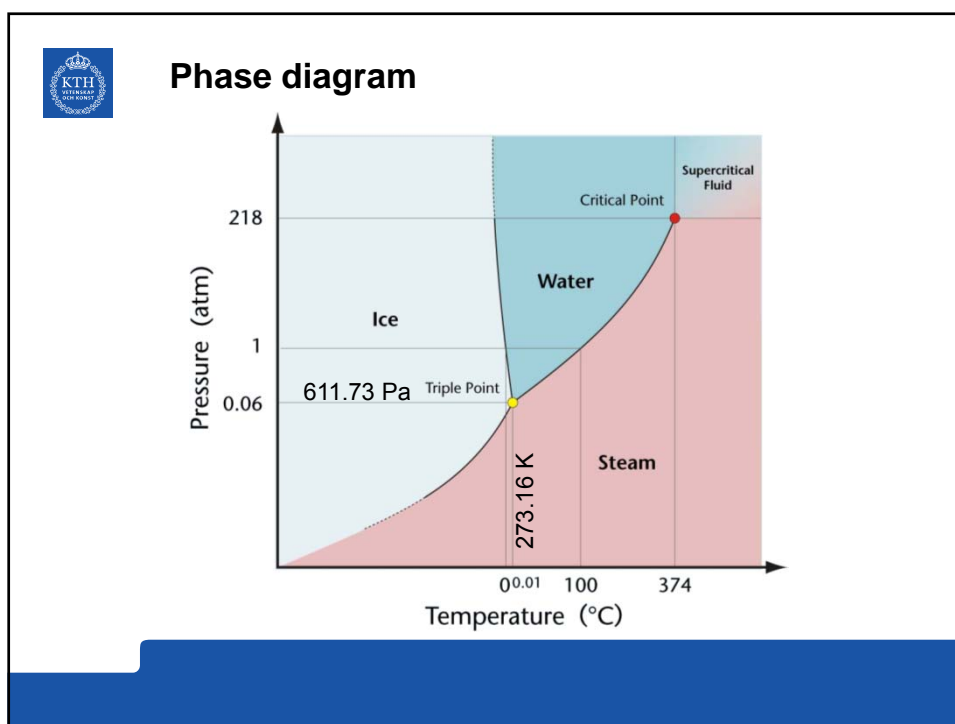
Bond strength H—OH₂: 21 kJ/mol Bond strength H-O: 460 kJ/mol

 **Phases**

Solid Liquid Gas



Order ← → Disorder

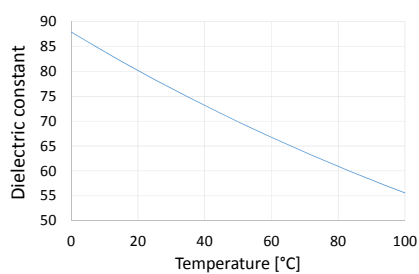




Dielectric constant

The dielectric constant, ϵ , is a measure of the degree of polarization or ability to make electrostatic bonds with other molecules

Water has a dipole moment \rightarrow high dielectric constant.
At lower T, ϵ will increase (stronger hydrogen bonds, stronger dipoles; stronger polarization)



Hydration

The free ions that are formed when dissolving a compound in water will be hydrated, i.e. they will be surrounded by a (various) number of water molecules; bound to the ion by the dipole moment.

Hydration is often denoted *aq*.