Effects on solubility

A solute dissolves in a solvent when it forms favorable interactions with the solvent. This dissolving process all depends upon the free energy change of both solute and solvent. The free energy of solvation is a combination of several factors.

First, a cavity must be created in the solvent. The creation of the cavity will be entropically and enthalpically unfavorable as the ordered structure of the solvent decreases and there are fewer solvent-solvent interactions. Second, the solute must separate out from the bulk solute. This is enthalpically unfavorable as solute-solute interactions are breaking but is entropically favorable. Third, the solute must occupy the cavity created in the solvent. This results in favorable solute-solvent interactions and is also entropically favorable as the mixture is more disordered than when the solute and solvent are not mixed.

when the solute and solvent are not mixed. Dissolution often occurs when the solute-solvent interactions are similar to the solvent-solvent interactions, signified by the term *like dissolves like*.[1] Hence, polar solutes dissolve in polar solvents, whereas nonpolar solutes dissolve in nonpolar solvents. There is no one measure of solvent polarity and so classification of solvents based on polarity can be carried out using different scales. (*see also: Solvents - solvent classification*)