Answer on Question #83898 – Chemistry – Inorganic Chemistry

All acids tend to indistinguishable in strength in strongly basic solvents. Explain

Solution:

Leveling effect or solvent leveling refers to the effect of solvent on the properties of acids and bases. The strength of a strong acid is limited ("leveled") by the basicity of the solvent. When a strong acid is dissolved in water, it reacts with it to form hydronium ion (H_3O^+). An example of this would be the following reaction, where "HA" is the strong acid:

$HA + H_2O \rightarrow A^- + H_3O^+$

In a differentiating solvent, various acids dissociate to different degrees and thus have different strengths. In a leveling solvent, several acids are completely dissociated and are thus of the same strength. A weakly basic solvent has fewer tendencies than a strongly basic one to accept a proton. Similarly a weak acid has fewer tendencies to donate protons than a strong acid. As a result a strong acid such as perchloric acid exhibits more strongly acidic properties than a weak acid such as acetic acid when dissolved in a weakly basic solvent. On the other hand, all acids tend to become indistinguishable in strength when dissolved in strongly basic solvents owing to the greater affinity of strong bases for protons. This is called the leveling effect. Strong bases are leveling solvents for acids; weak bases are differentiating solvents for acids.