

TDC-II Paper-III Inorganic Chem. (Solvent system)

Comparison between liquid NH_3 and water as solvent

Liquid NH_3

Water

- | Liquid NH_3 | Water |
|--|---|
| <p>I) Liquid NH_3 has liquid range -33.5°C to -77.7°C hence suitable solvent at low temperature in its liquid range</p> | <p>I) Water (H_2O) has liquid range 0°C to 100°C hence water is suitable solvent comparatively at higher temperature in its liquid range</p> |
| <p>II) its dielectric constant is (22) which is smaller than that of water. Therefore lower dielectric constant results in a generally decreased ability of liquid NH_3 to dissolve ionic compound</p> | <p>II) its dielectric constant is 78.5 (at 25°C) which is higher than liquid NH_3 (22) hence water has more ability to dissolve ionic compounds</p> |
| <p>III) It is poor solvent for most of ionic reaction</p> | <p>III) It is good solvent for most of ionic reactions.</p> |
| <p>IV) Alkali metals are highly soluble in liquid NH_3 & less reactive</p> | <p>IV) alkali metals are soluble in water due to reaction</p> |

The dissolution of metal in liquid NH_3 without ~~the~~ chemical reaction is the greatest advantage of liquid NH_3 to use as a solvent

- dissolved alkali metals are recovered by evaporation

- Due to its offensive odor, it needs special techniques to use as a reaction medium.

- The tendency for solvolysis is less in liquid NH_3 than water

The dissolution of ^{metal in} water with chemical reactions makes it unsuitable to use water as solvent for metal reaction with organic compound.

- dissolved metal in water can't be recovered by evaporation.

- It is odorless hence it can be widely used with safe and odorless environment.

- The tendency for solvolysis is more in water than in liquid NH_3
