THE FACTORS AFFECTING THE CONDUCTANCE OF ELECTROLYTE SOLUTIONS

Temperature: The conductance of an electrolyte solution increases with increase in the temperature due to increase in the extent of inonization.

Nature of electrolyte:

* The strong electrolytes undergo complete ionization and hence show higher conductivities since they furnish more number of ions.

* Whereas weak electrolytes undergo partial ionization and hence show comparatively low conductivities in their solutions.

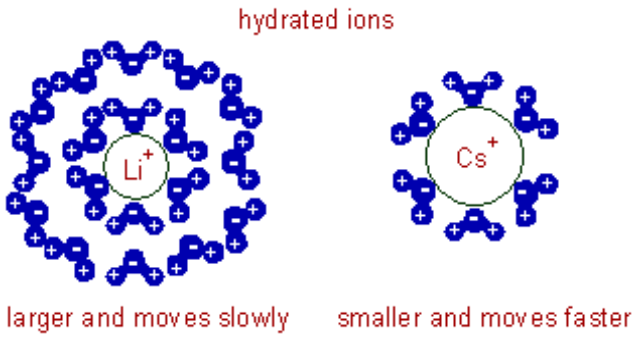
Ionic size & mobility:

* The ionic mobility decreases with increase in its size and hence conductivity also decreases.

E.g. In molten state, the conductivities of lithium salts are greater than those of cesium salts since the size of Li^+ ion is smaller than that of Cs^+ ion.

* However, in aqueous solutions the extent of hydration affects the mobility of the ion, which in turn affect the conductivity. Heavily hydrated ions show low conductance values due to larger size.

E.g. In aqueous solutions Li^+ ion with high charge density is heavily hydrated than Cs^+ ion with low charge density. Hence hydrated Li^+ bigger than hydrated Cs^+ . As a result, lithium salts show lower conductivities compared to those of cesium salts in water.



The nature of solvent and its viscosity:

* The ionic mobility is reduced in more viscous solvents. Hence the conductivity decreases.

Concentration:

* The specific conductance (κ) increases with increase in concentration of solution as the number of ions per unit volume increases.

* Whereas, both the equivalent conductivity and molar conductance increase with **decrease** in concentration (i.e. upon dilution) since the extent of ionization increases.

Explanation: Since the concentration decreases, one can expect decrease in equivalent conductivity due to decrease in available number of ions per unit volume. However the increase in volume (V) factor more than compensates this effect. The volume must be increased in order to get one equivalent of electrolyte since the concentration is decreased. Hence the net effect is increase in equivalent conductivity.