Conductivity Technical Information

Definitions

- **Activity:**

The activity is a measure of the amount of ions chemically active in a concentration of the ions in solution. This means that the participation of ions in a chemical reaction is not only determined by the concentration but also by the presence of other ions in the solution. In concentrated solution the activity of the ions is considerably less than the total concentration.

- **Activity Coefficient:**

The activity coefficient (F) shows the ratio between the active concentration and the total concentration.

F = active concentration / total concentration

- **Anions:**

Anions are negatively charged ions, e.g. Cl^-, NO^-, OH^-.

- **Automatic Temperature Compensation:**

Automatic control of the sensitivity of the measuring converter to compensate for the reaction of the chemical equilibrium.

- **Capacity:**

The capacity of a conductor is the quotient of the charge and, as a result of this charge, the generated voltage of a conductor.

- **Cell Constant:**

The cell constant of a conductivity measuring cell is determined by the ratio of the distance between the electrodes and the area of the electrodes.

C = L / O (cm -1; m -1)

- **Concentration:**

The concentration of a solution is determined by the quantity of matter dissolved per volume or per weight of the solution.

1. **Grams per dm^3 (liter) or kilograms/m^3:**
   The weight in grams per dm^3 (liter) solution.
2. **Grams per kilogram:**
   The weight in grams of matter per kilogram of solution.
3. **Milligrams per kilogram:**
   The weight in milligrams of matter per kilogram of solution.
   NOTE: This is commonly expressed as ppm (parts per million).
4. **Micrograms per kilogram:**
   The weight in micrograms of matter per kilograms of solution.

NOTE: This is commonly expressed as ppb (part per billion).

5. **Mol per liter or molar:**
   The weight in grams corresponding with the molecular weight per liter of solution.
6. **Mol per kilograms or molar:**
   The weight in grams corresponding with the molecular weight per kilograms of solution.
7. **Weight percents:**
   The weight of dissolved matter per 100 grams of solution.

- **Condensate:**

The name of a solution after condensation of steam.

- **Current Density:**

The number of the ratio between the current value and the area of the conductor.

- **Dissociation of Ions:**

Dissociation is separating into positive and negative ions.

- **Dissociation Constant:**

The number gives the ratio between the concentration of the separated ions in a matter and the concentration of the unseparated matter.

AB = A / B

K = [A] [B] / [AB]

- **Electrolyte:**

An electrolyte is a matter that separates ions in an aqueous solution. Weak electrolytes partly dissociate, strong electrolytes dissociate almost completely.

- **Equivalent Conductivity:**

The equivalent conductivity of a solution is the specific conductivity of this solution when 1 kilogram equivalent/m^3 or 1 gram equivalent/dm^3 of the solid matter is dissolved.

- **Hydration:**

Hydration is the surrounding of ions with molecules of water.

- **Ion Strength:**

The strength of ions in a solution is determined by both the concentrations of the ions in the solution and the nature of these ions. The strength of ions determines the activity of each ion in the solution. In an equation, the strength of ions is:

$I = 0.5\ (C)(Z^2)$

C = concentration

Z^2 = square of the charge of the ion

- **Polarization Effect:**

Screening of the electrodes of a conductivity measuring cell, e.g. by an incomplete discharge of ions.

- **Rhondinising of Electrodes:**

The addition of a rhondium layer on the electrode surfaces for the increase of these surfaces.

- **Scale Factor (f):**

The number of the ratio between the conductivity value at the process temperature and the conductivity value at the reference temperature.

- **Temperature Coefficient:**

Indicates the temperature influence on the chemical equilibrium (e.g. dissociation) of the solution.