5. Conclusions

Determining concentration plays an important role in chemical engineering, so it could represent both continuous and static methods for concentration determination. The continuous method, by using conductivity, is very useful for uninterrupted concentration measurements.

The conductivity sensitivity method is an alternative method for accurately quantifying reactant or product concentrations. The conductivity sensitivity method is a very simple method over two stages, individually, for both strong and weak electrolytes:

1) Determining the concentration by using the theory of strong and weak electrolytes

2) Determining the sensitivity constant for strong and weak electrolytes.

This method applies sensitivity parameters for determining reactant or product concentrations for strong and weak electrolytes, by using conductivity. Specific characteristics can be found from the measurements, especially for strong and weak electrolytes. Concentrations of strong electrolytes can be determined by linear extrapolation, whilst concentrations of weak electrolytes can be determined by quadratic mathematical extrapolation. This method proposes a continuous determination of reactant or product concentrations.

Each reaction has specific characteristic sensitivity parameters which can be determined by using mathematical extrapolation. Conductivity for a specific reaction has a specific characterization, therefore, certain sensitivity parameters can be determined – the sensitivity constant of conductivity, which is constant during the specific reaction. Now that we know the sensitivity constants of conductivity, therefore, any value for reactant or product concentration can be calculated.

6. References

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Nomenclature

c	concentration, mol/L
K	constant in Kohlrausch equation, mS $m^2/((mol\ L^{-1})^{1/2}\ mol)$
k	reaction rate constant
n, m	rate order, /
r	rate of reaction
R	gas law constant, J/(mol · K)
T	temperature, K
t	time of reaction, min
X	degree of conversion, 1
κ	conductivity, mS/dm
Λ_m^o	molar conductivity at infinite dilution, $S\ m^2\ mol^{-1}$
Λ_m	molar conductivity, $S\ m^2\ mol^{-1}$