

9.3 ION EXCHANGE

Ion exchangers are widely used in analytical laboratories in different ways and for different purposes. The procedures can be classified as follows:

9.3.1 Ion Exchange Operations Based on Total Exchange

Ion exchangers (resins or other solid materials suitable for ion exchange) are widely used in analytical laboratories as a preliminary chemical operation for the enrichment of trace amounts of metal ions, other ions or ionic and non ionic organic substances, for separation of interfering ions or elements or simply to change the ionic composition of an electrolyte, e.g. to convert a salt to acid or vice versa.

In these applications (enrichment, separation of interfering substances, impurities, salt splitting, change of composition of a solution, etc.) the exchange of certain ions is complete (or at least is expected to be complete). If separations are made, the separation factors are high (greater than 10^2).

9.3.2 Separation and Determination of Inorganic and Organic Substances by Ion Exchange Chromatography

Ion exchange chromatography is used if at least two ions or molecules of similar chemical character are present. It can be used successfully to analyze very complicated mixtures containing many components of similar behavior. See 9.2.5.

9.3.3 Ion Exchangers Used as Carriers

Ion exchangers saturated with certain reagent ions, enzymes, etc. can be used as stable reagents. Sometimes the ion exchanger acts as a carrier, on which the reaction takes place.

9.3.4 Fundamental Terms and Definitions concerning ion exchange, ion exchangers and characteristics of ion exchangers (capacity, swelling, selectivity, etc.) are all included and presented in Section 9.2.5 Special Terminology used in Ion Exchange Chromatography.