9.2.5.3 The Chromatographic Medium

Ion Exchangers

A solid or liquid, inorganic or organic substance containing ions exchangeable with others of the same charge, present in a solution in which the ion exchanger is considered to be insoluble.

Note: It is recognized that there are cases where liquid exchangers are employed and where it may be difficult to distinguish between the separation process as belonging to ion exchange or liquid-liquid distribution, but the broad definition given here is regarded as that which is most appropriate.

Resin Matrix

The molecular network of an ion exchanger which carries the ionogenic groups.

Monofunctional Ion Exchanger

An ion exchanger containing only one type of ionogenic group.

Bifunctional Ion Exchanger

An ion exchanger containing two types of ionogenic groups.

Polyfunctional Ion Exchanger

An ion exchanger containing more than one type of ionogenic groups.

Macroporous Ion Exchanger

An ion exchanger with pores that are large compared to atomic dimensions.

Salt Form of an Ion Exchanger

The ionic form of an ion exchanger in which the counter-ions are neither hydrogen nor hydroxide ions. When only one valence is possible for the counter-ion, or its exact form or charge is not known, the symbol or the name of the counter-ion without charge is used, e.g., sodium-form or Na-form, tetramethylammonium-form, orthophosphate-form. When one of two or more possible forms is exclusively present, the oxidation state may be indicated by a Roman numeral, e.g., Fe^{II}-form, Fe^{III}-form.

Redox Polymers

Polymers containing functional groups which can be reversibly reduced or oxidized. *Electron Exchanger* may be used as a synonym.

Redox Ion Exchangers

Conventional ion exchangers in which reversible redox couples have been introduced as counter-ions either by sorption or complex formation. They closely resemble redox polymers in their behaviour.

Cation Exchanger

Ion exchanger with cations as counter-ions. The term *Cation-Exchange Resin* may be used in the case of solid organic polymers.

Acid Form of a Cation Exchanger

The ionic form of a cation exchanger in which the counter-ions are hydrogen ions (H-form) or the ionogenic groups have added a proton forming an undissociated acid.

Anion Exchanger

Ion exchanger with anions as counter-ions. The term *Anion-Exchange Resin* may be used in the case of solid organic polymers.

Base Form of an Anion Exchanger

The ionic form of an anion exchanger in which the counter-ions are hydroxide groups (OH-form) or the ionogenic groups form an uncharged base, e.g., $-NH_2$.

Ion-Exchange Membrane

A thin sheet or film of ion-exchange material which may be used to separate ions by allowing the preferential transport of either cations (in the case of a *Cation-Exchange Membrane*) or anions (in the case of an *Anion-Exchange Membrane*). If the membrane material is made from only ion-exchanging material, it is called a *Homogeneous Ion-Exchange Membrane*. If the ion-exchange material is embedded in an inert binder, it is called a *Heterogeneous Ion-Exchange Membrane*.

Perm-Selectivity

A term used to define the preferential permeation of certain ionic species through ion-exchange membranes.

Weight-Swelling Ratio in Solvent

Mass of solvent taken up by unit mass of the dry ion exchanger. The solvent must always be specified.

Volume-Swelling Ratio

Ratio of the dry swollen volume to the true dry volume of the ion exchanger.