SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai

Approved by Pharmacy Council of India, New Delhi.

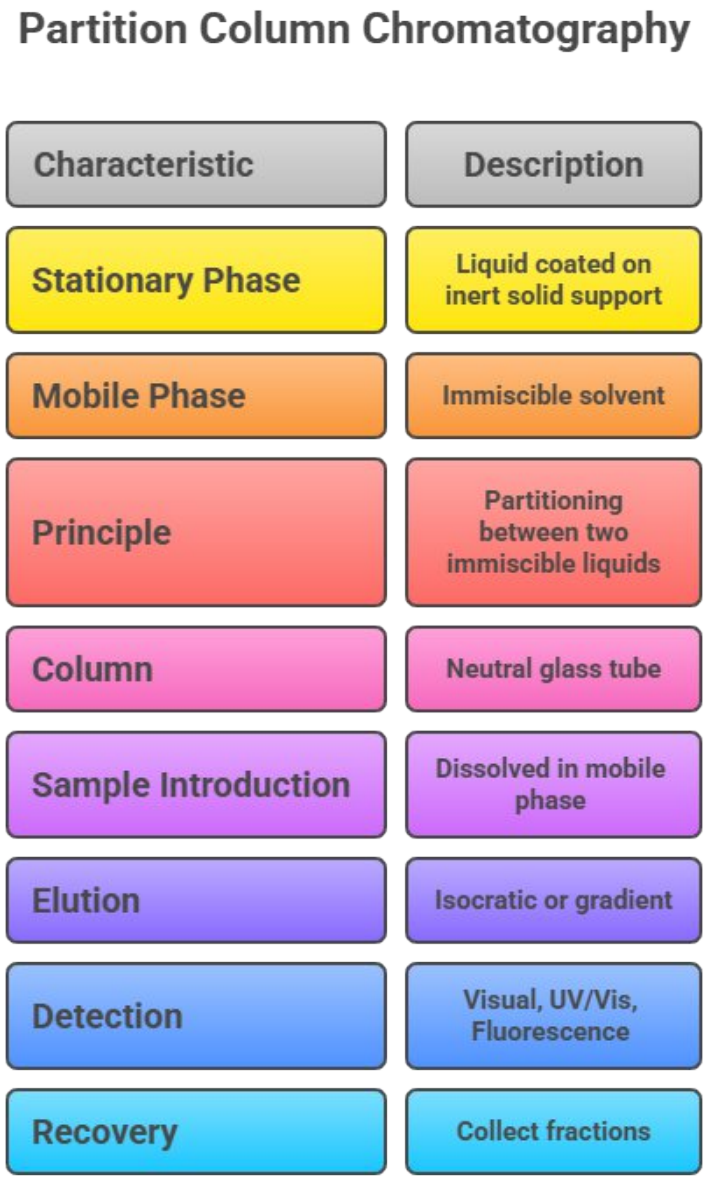
Coimbatore -641035

COURSE NAME: INSTRUMENTAL METHODS OF ANALYSIS (BP 701 T)

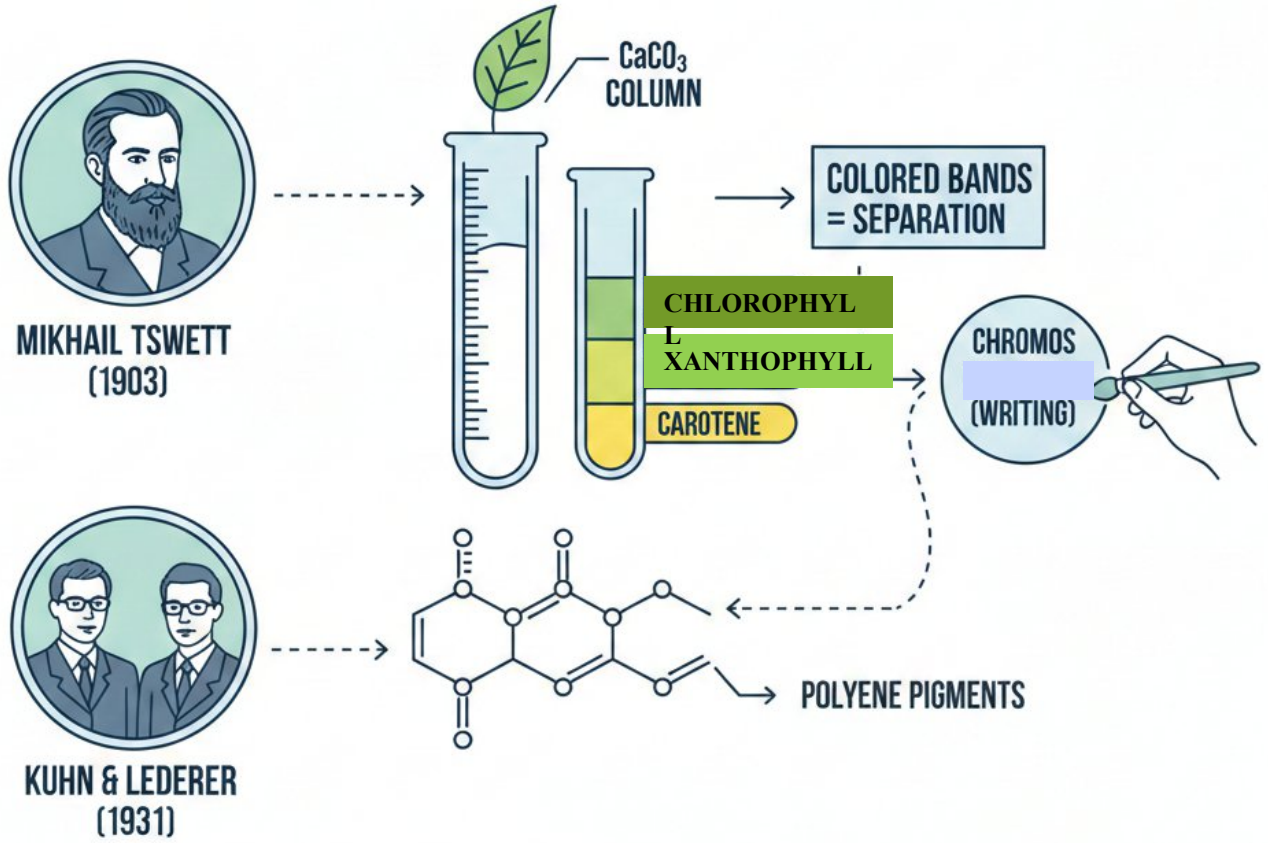
VII SEM/ IV YEAR

TOPIC 22: PARTITION COLUMN CHROMATOGRAPHY

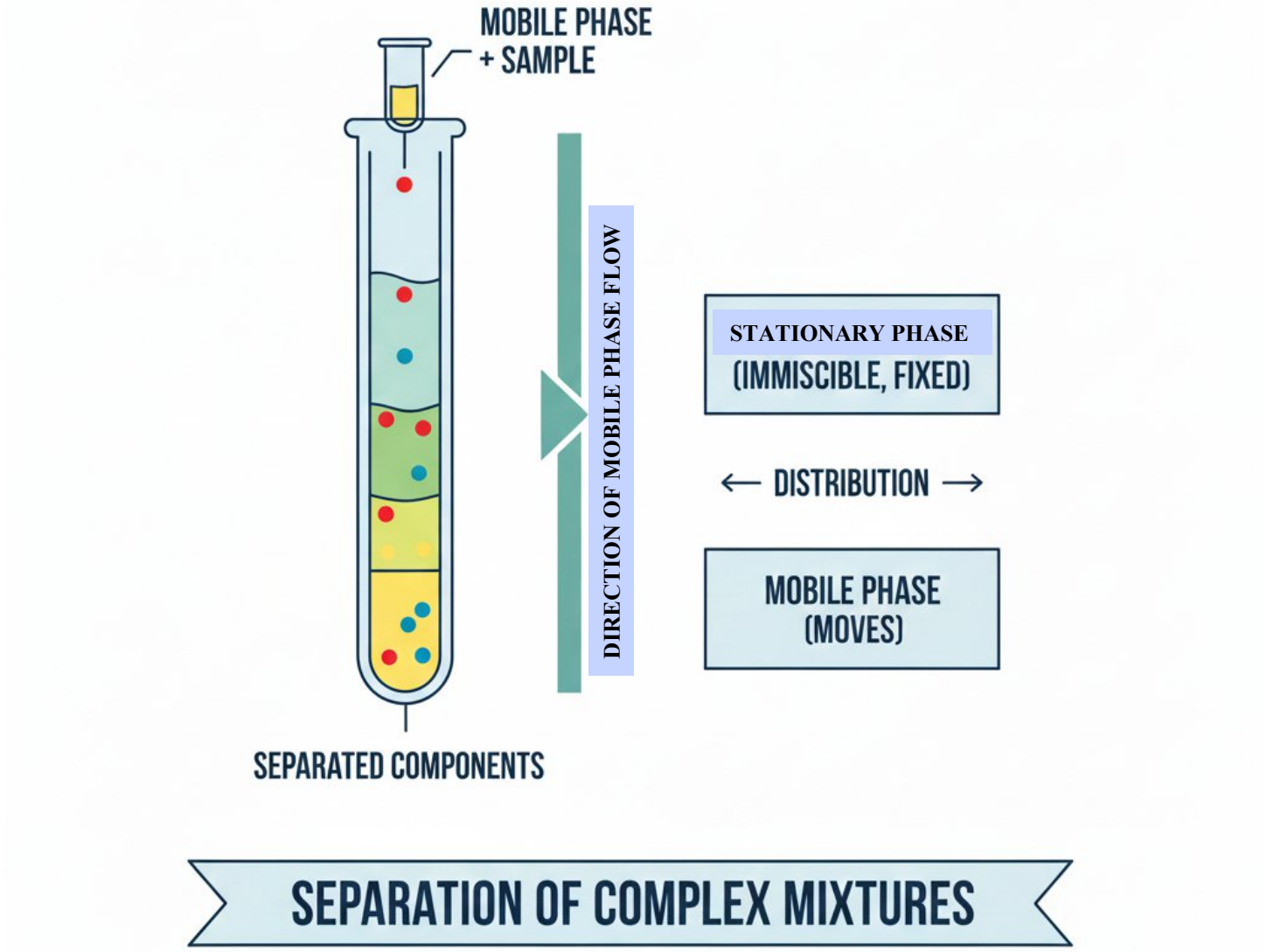
MINDMAP:


Partition Column Chromatography
Characteristic
Description
Stationary Phase
Liquid coated on inert solid support
Mobile Phase
Immiscible solvent
Principle
Partitioning between two immiscible liquids
Column
Neutral glass tube
Sample Introduction
Dissolved in mobile phase
Elution
Isocratic or gradient
Detection
Visual, UV/Vis, Fluorescence
Recovery
Collect fractions

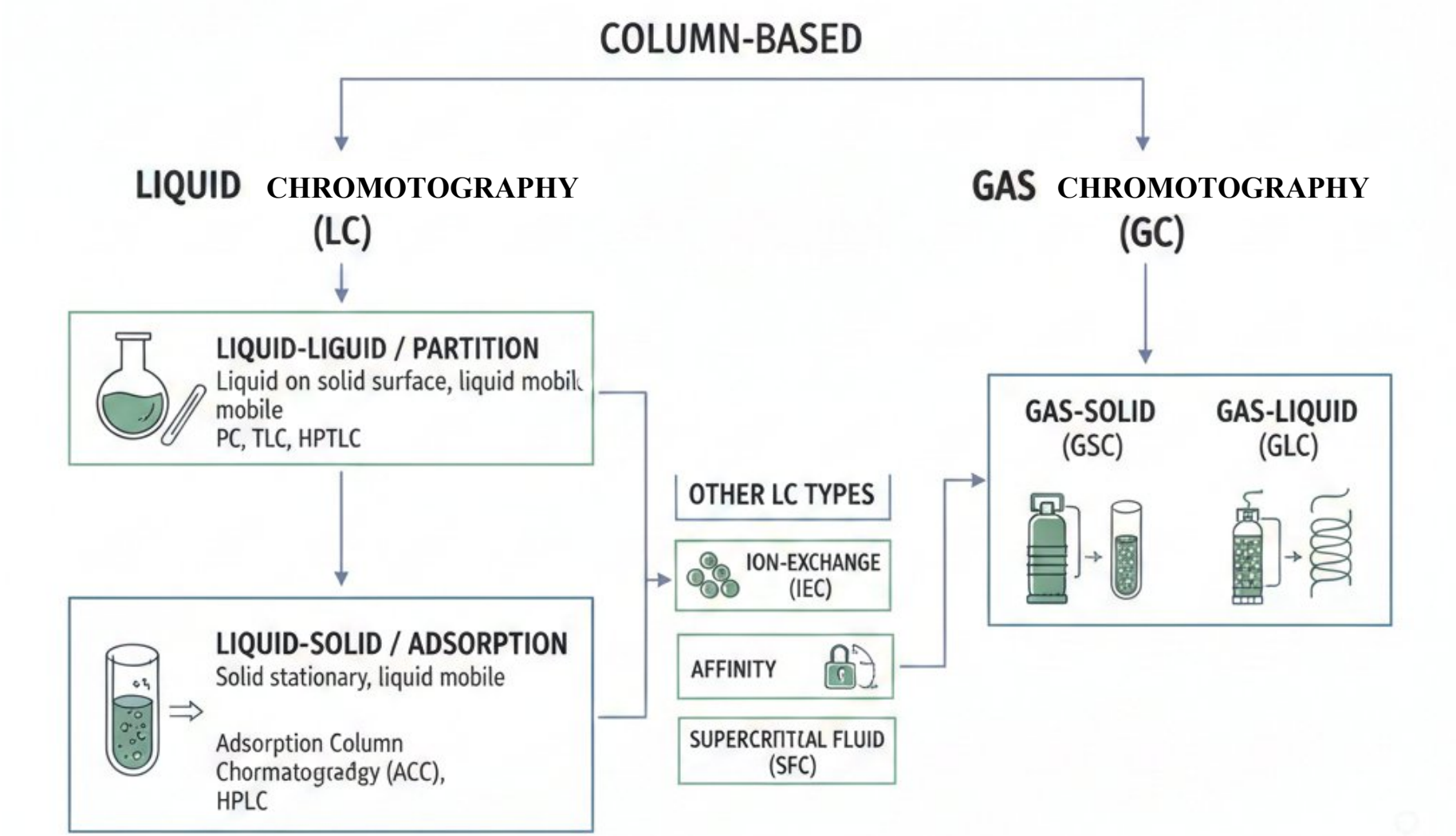
Introduction to Chromatography



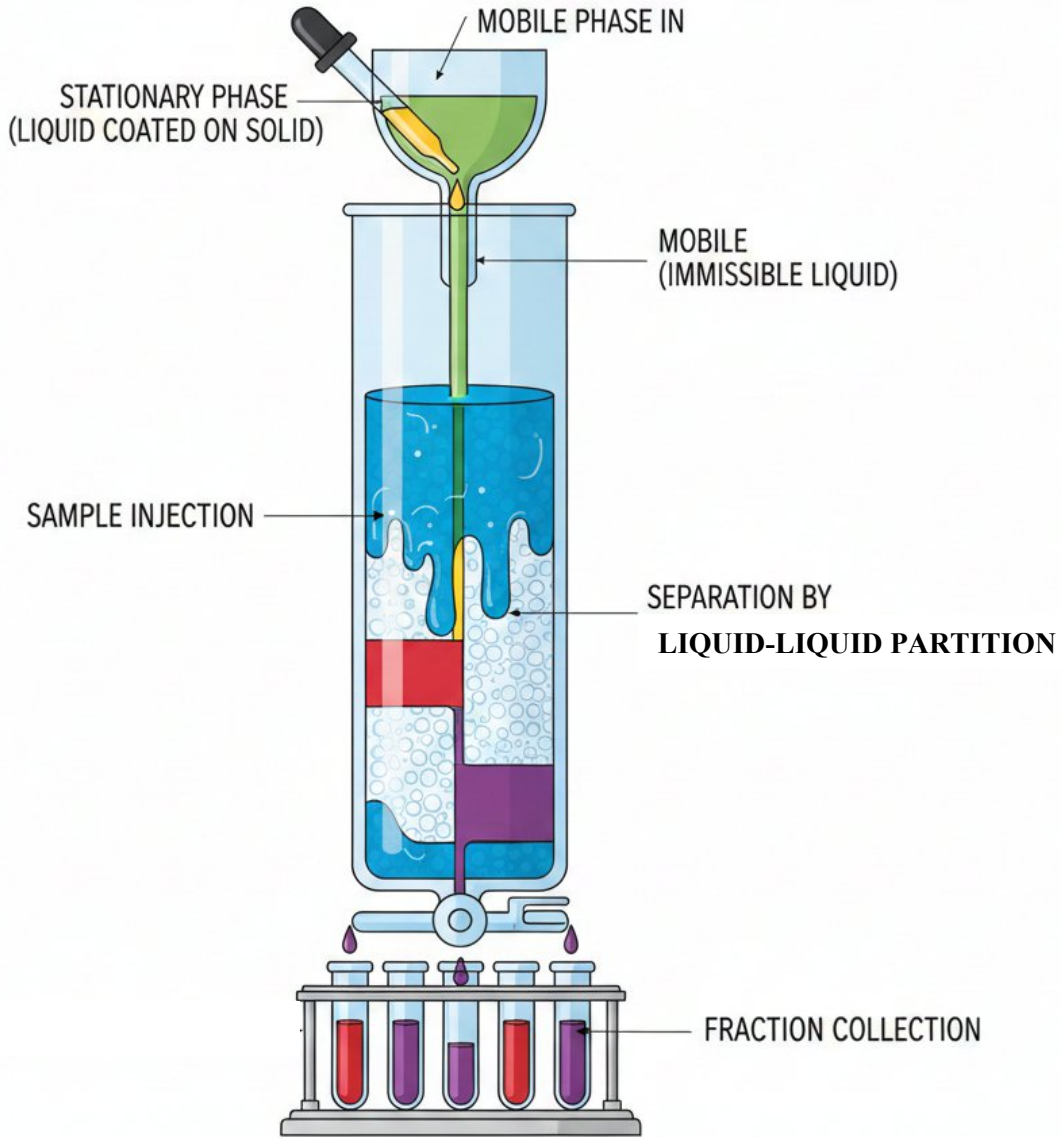
Definition of Chromatography



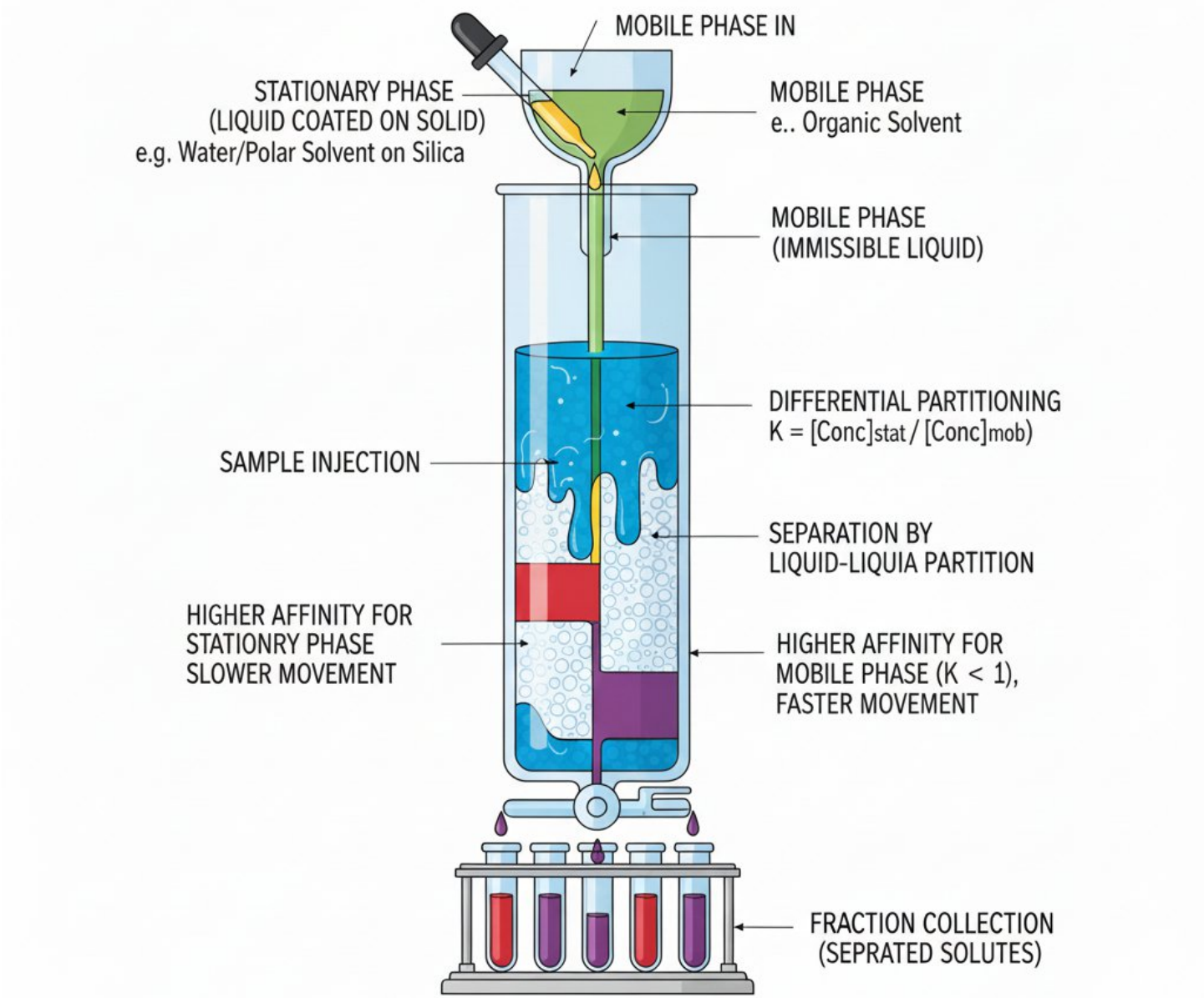
Classification of Chromatographic Methods (Relevant to Column)



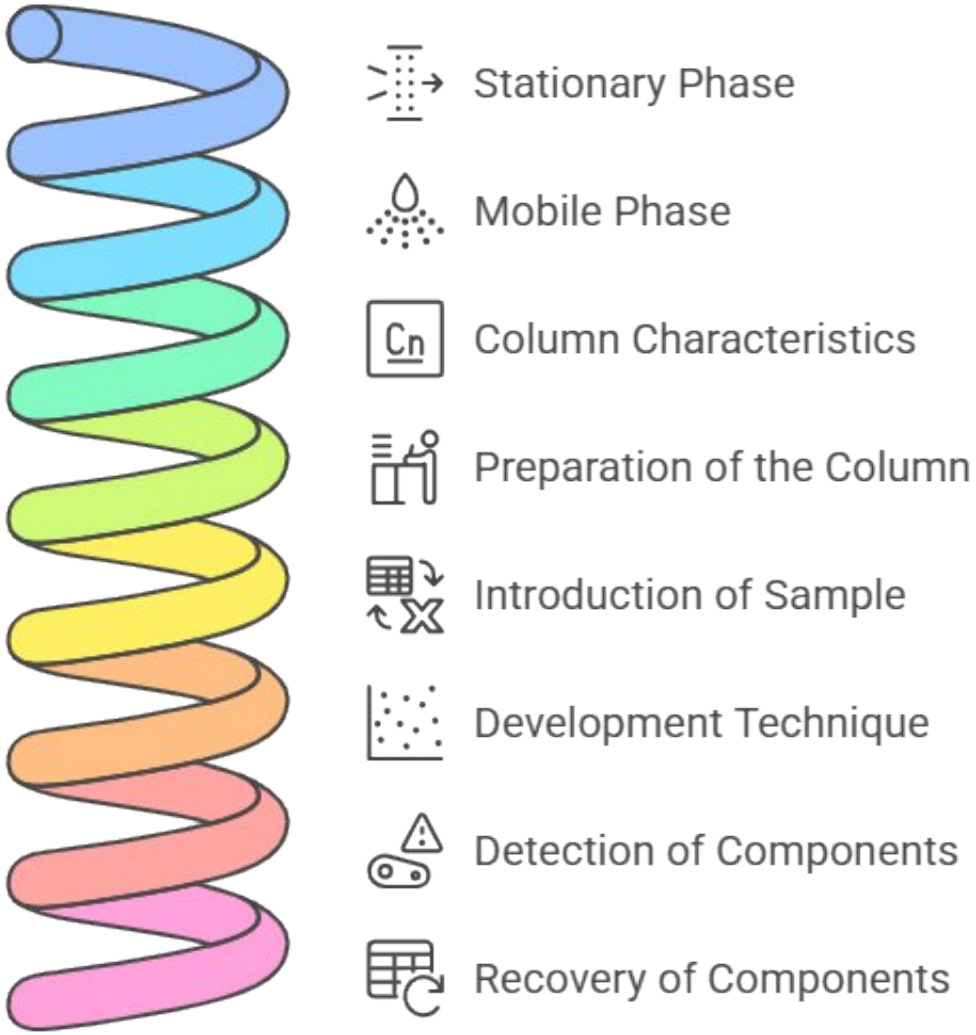
Partition Column Chromatography



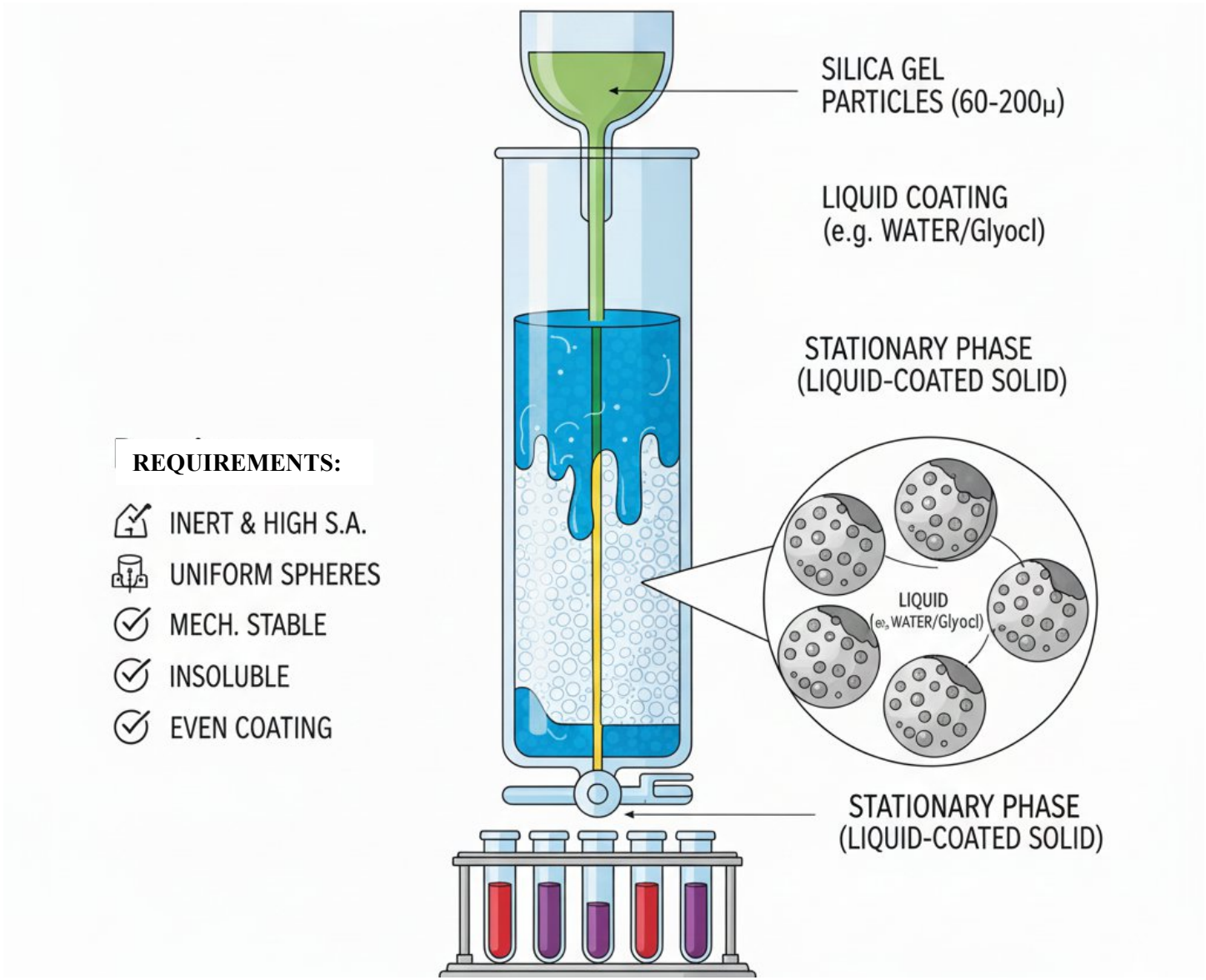
Principle


MOBILE PHASE IN
STATIONARY PHASE
(LIQUID COATED ON SOLID)
e.g. Water/Polar Solvent on Silica
MOBILE PHASE
e.. Organic Solvent
MOBILE PHASE
(IMMISSIBLE LIQUID)
DIFFERENTIAL PARTITIONING
K = [Conc]stat / [Conc]mob)
SAMPLE INJECTION
SEPARATION BY
LIQUID-LIQUIA PARTITION
HIGHER AFFINITY FOR
STATIONRY PHASE
SLOWER MOVEMENT
HIGHER AFFINITY FOR
MOBILE PHASE (K < 1),
FASTER MOVEMENT
FRACTION COLLECTION
(SEPRATED SOLUTES)

Requirements



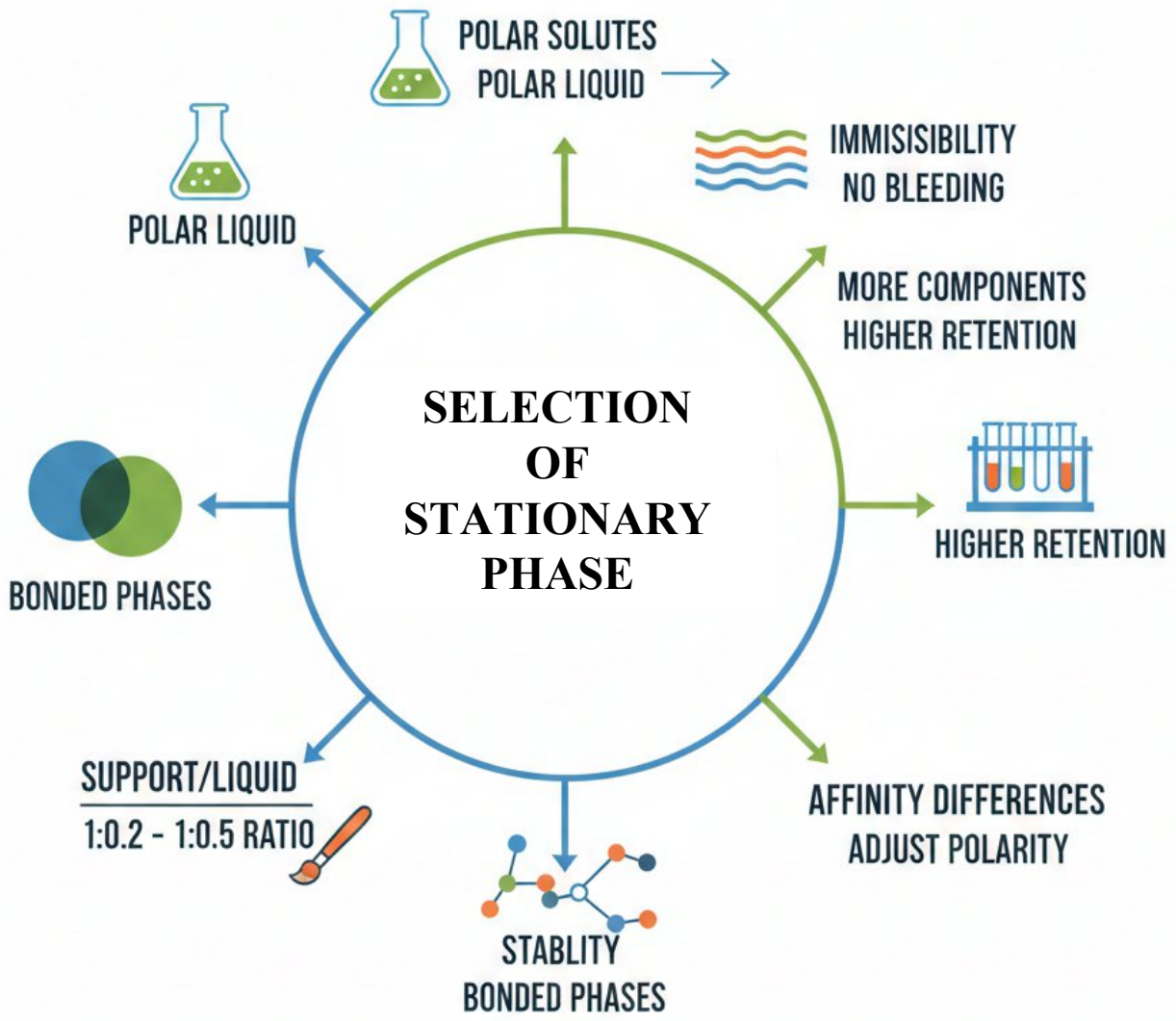
Stationary Phase



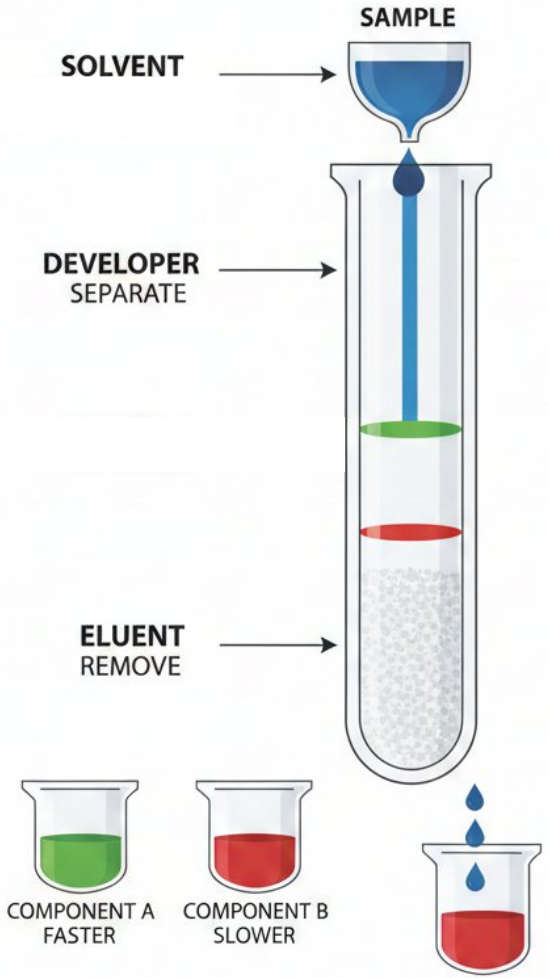
Supports and Solvents

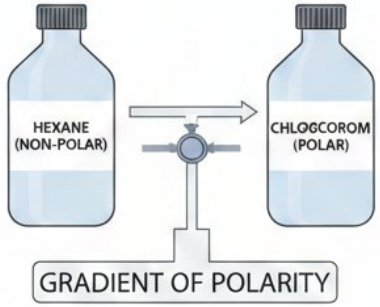
Polarity of Stationary Phase	Common Stationary Liquids	Mobile Phase Examples (Immiscible)	Mode
High (Polar/Normal Phase)	Water, Ethylene glycol, Buffered aqueous solutions, Other polar solvents (e.g., formamide)	Non-polar organics: Petroleum ether, Hexane, Chloroform, Benzene, Cyclohexane	Normal Phase Partition
Medium	Alcohols (e.g., Butanol), Acetone mixtures	Moderately polar: Ethyl acetate, Chloroform mixtures, Toluene	Normal/Intermediate
Low (Non-Polar/Reversed Phase)	Hydrocarbons (e.g., Silicone oils, Squalane), Non-polar liquids	Polar: Water, Methanol, Acetonitrile, Aqueous mixtures	Reversed Phase Partition

Selection of Stationary Phase



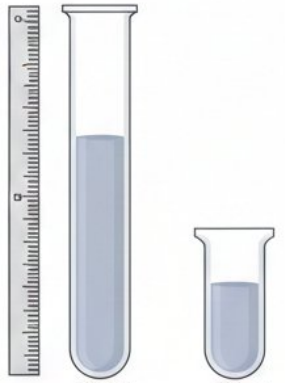
Mobile Phase





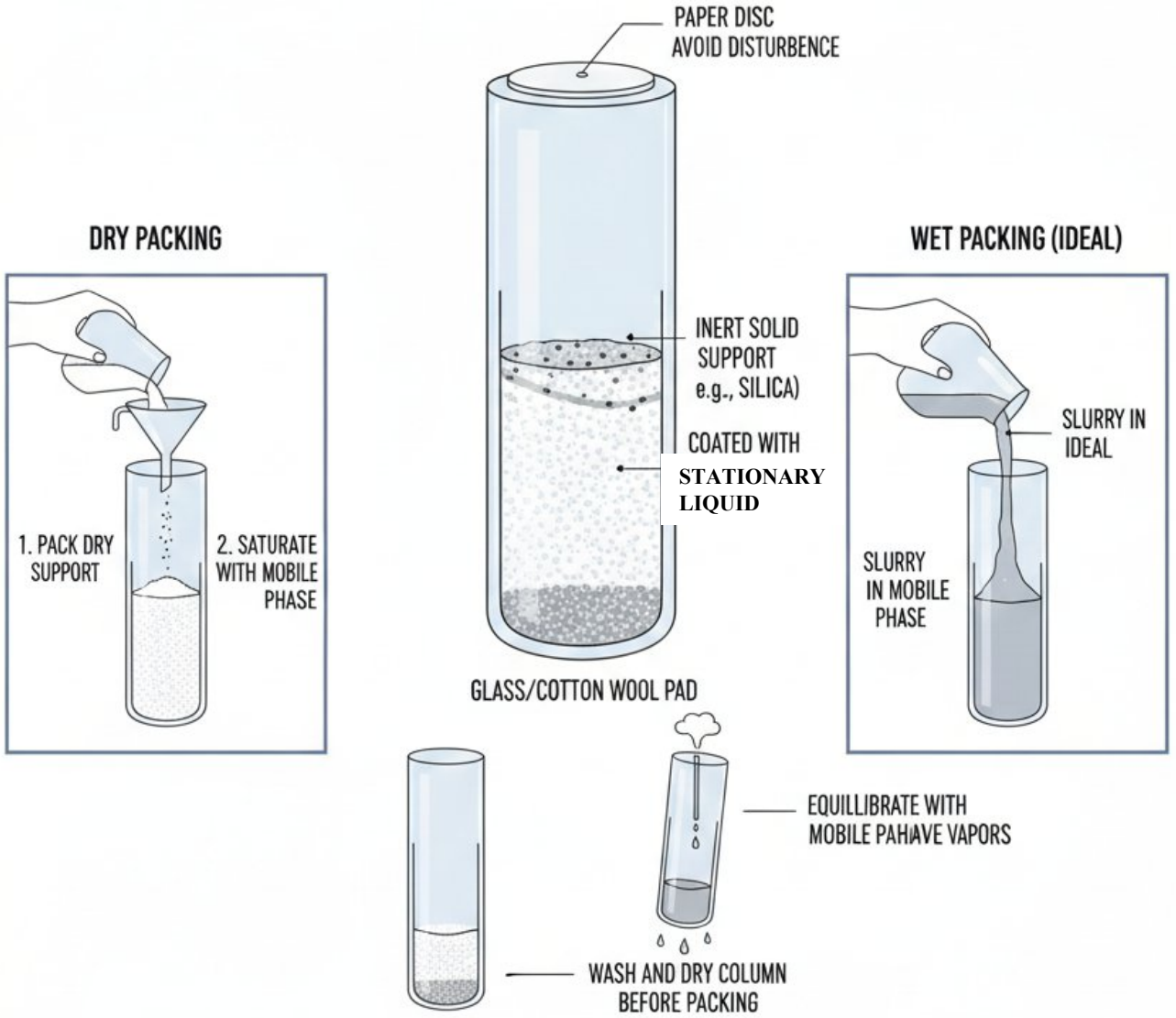
COMMON ORGANIC SOLVENTS:
CHLOROROM, METAHOL,
ACETONE, ETHANOL

100:1 EFFICIENT
(SIMILAR COMPONENTS)

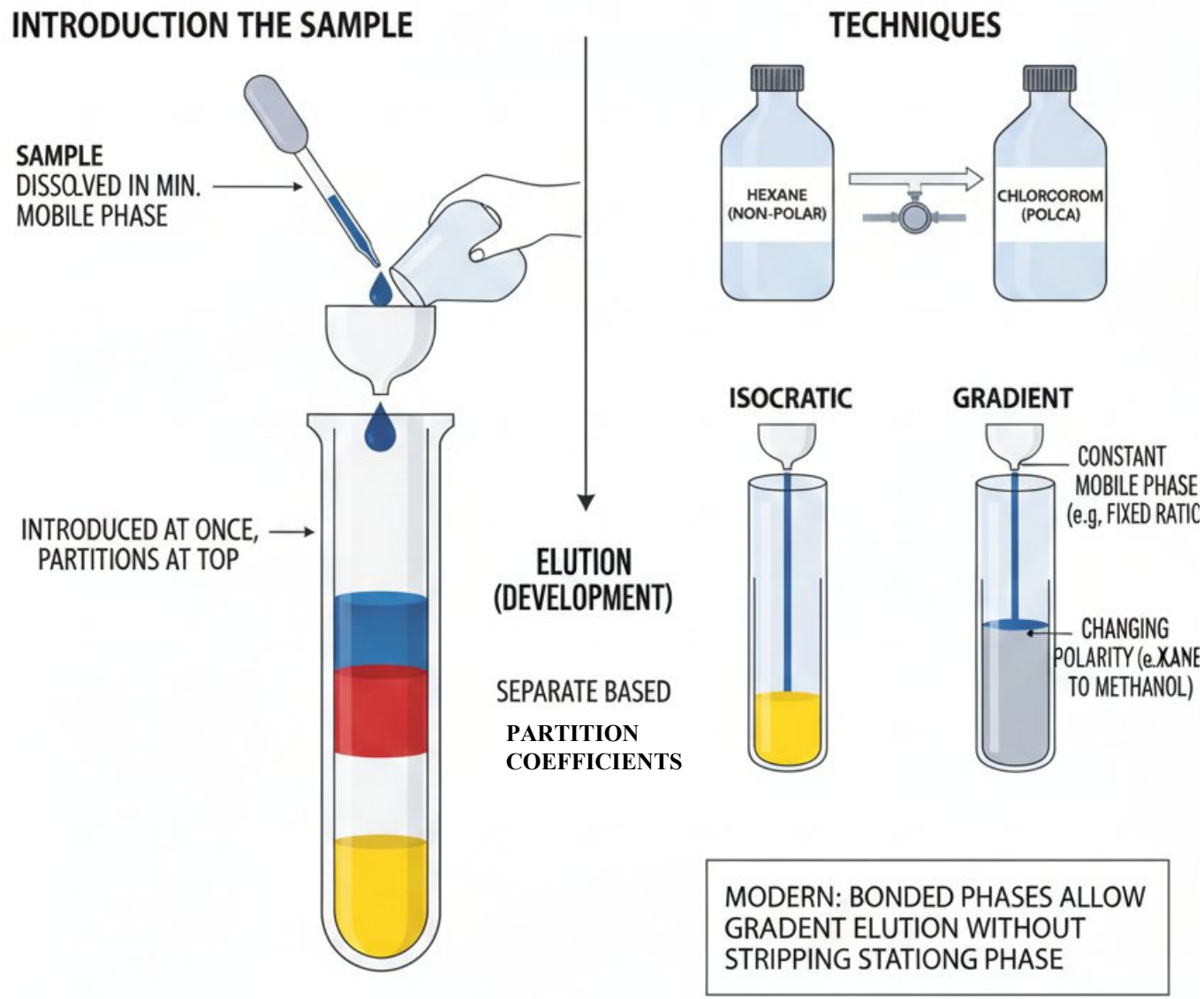


10:1 **10:1**
(DISTINCT COMPONENTS)

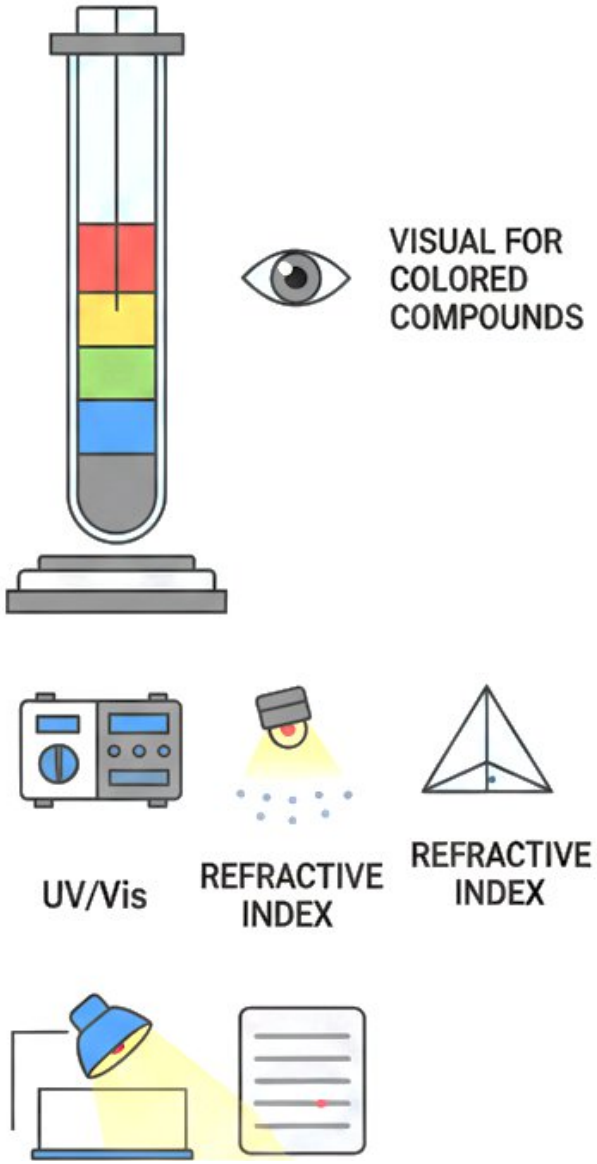
Preparation of the Column



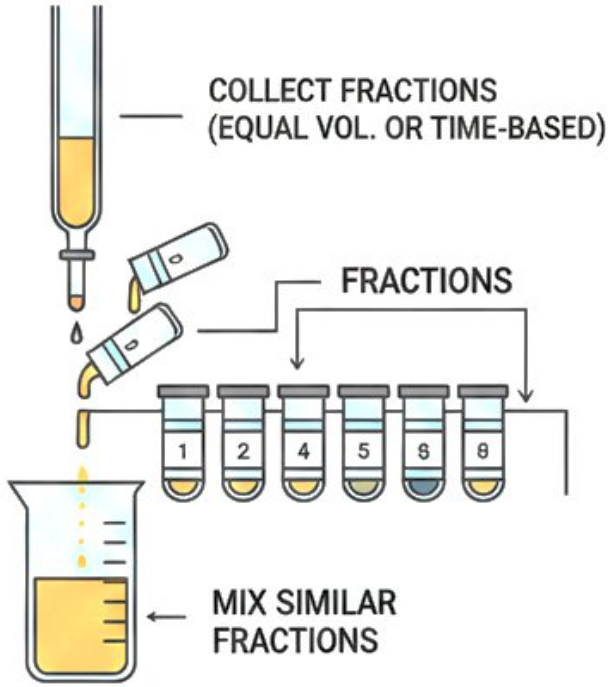
Introduction of Sample and Elution



Detection

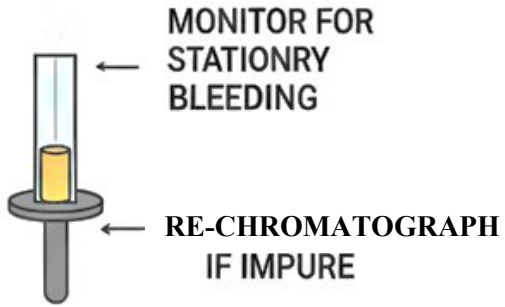

VISUAL FOR COLORED COMPOUNDS
UV/Vis
REFRACTIVE INDEX
REFRACTIVE INDEX

Recovery

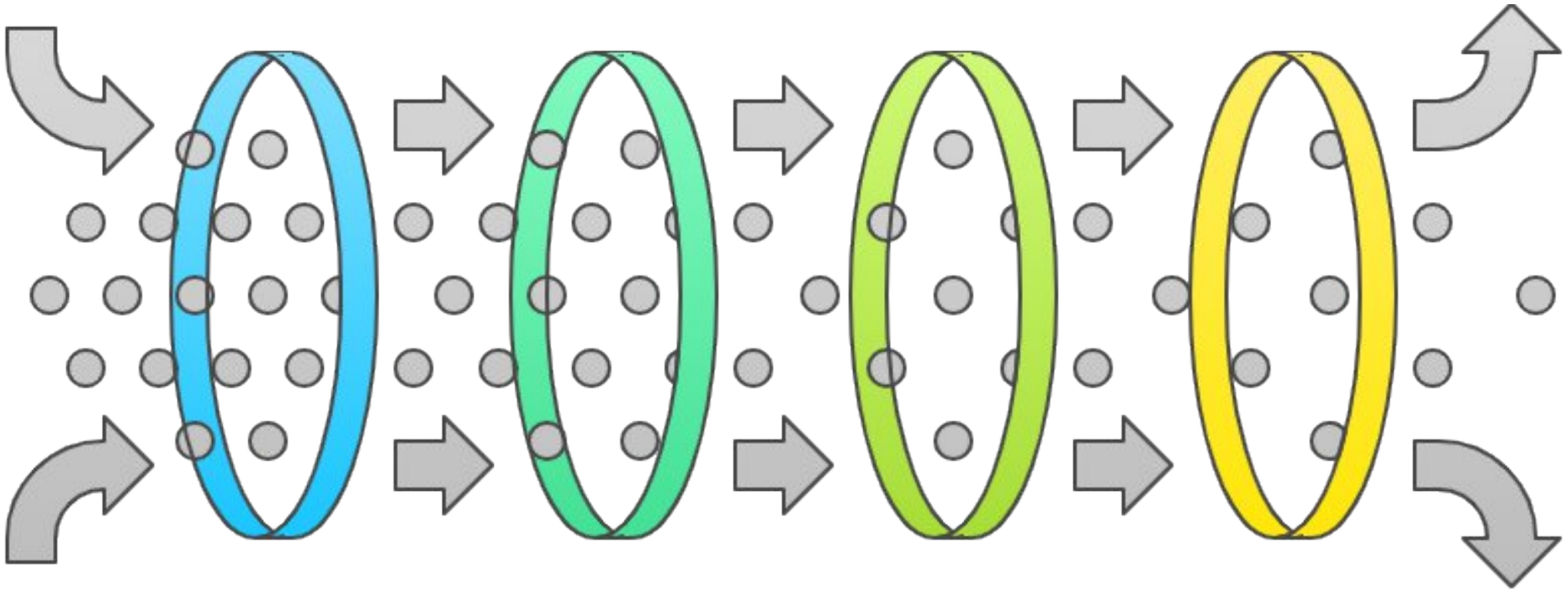


ELUATE = COMPONENTS

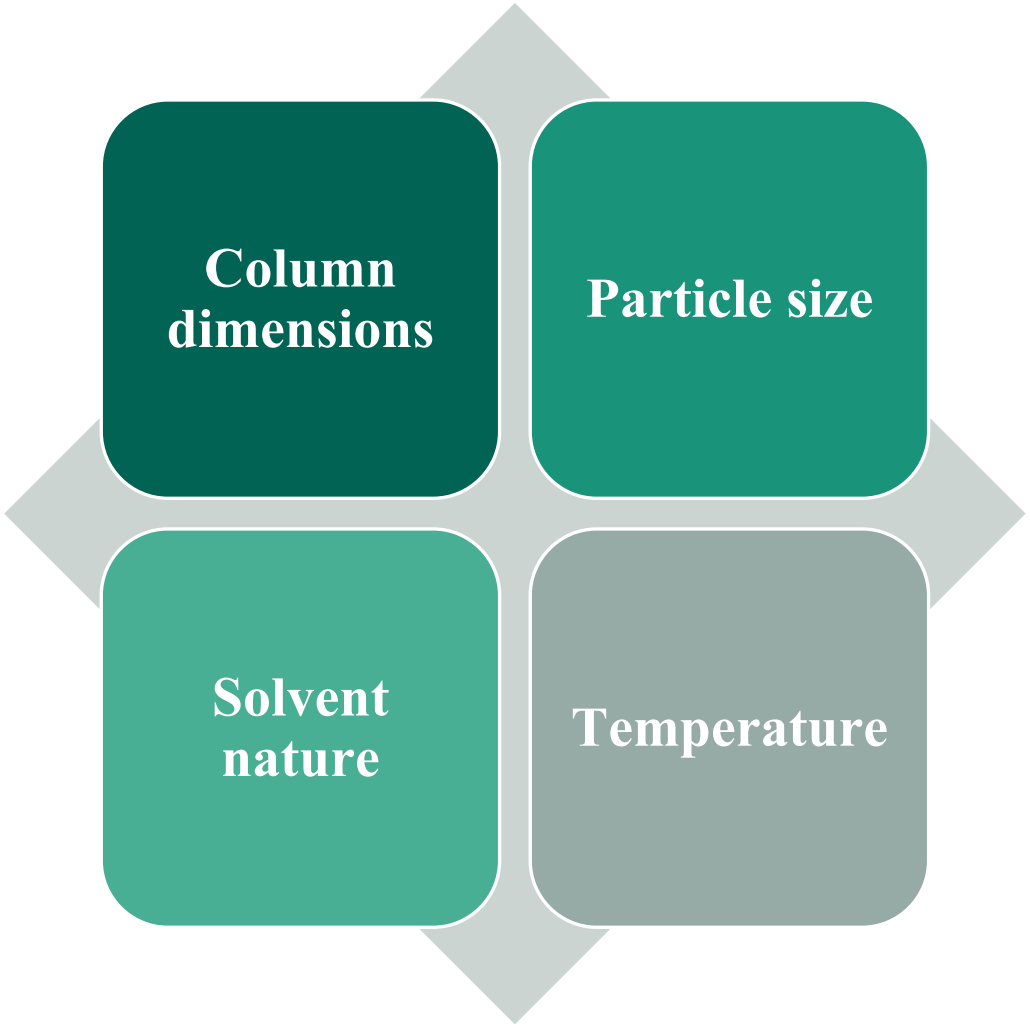
ELUENT = MOBILE PHASE



Applications:



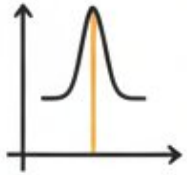
Factors Affecting Efficiency



Advantages

- Effective for polar/ionic compounds

- Less tailing than adsorption



- Suitable for biomolecules

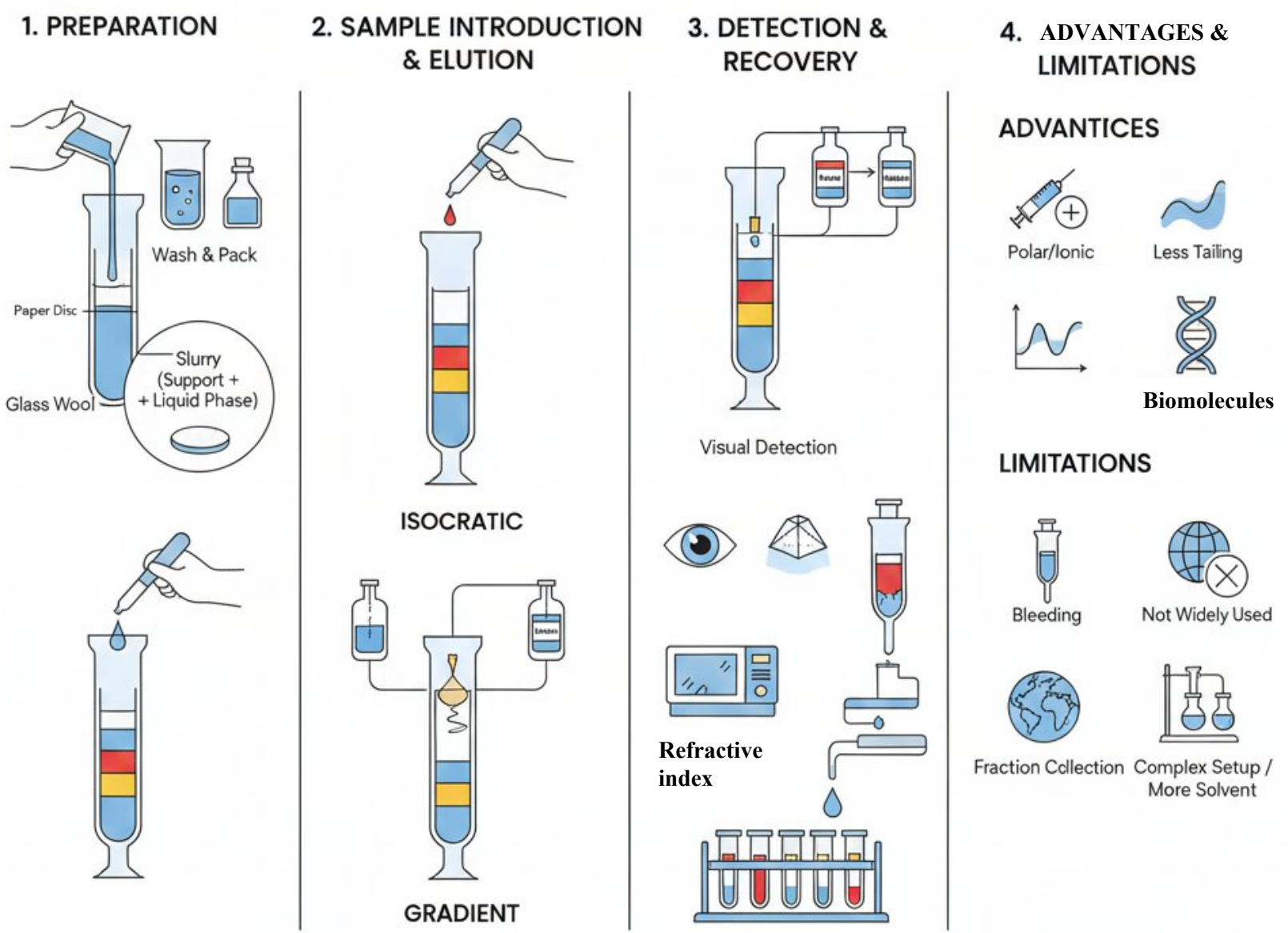
Limitations

- Stationary phase may bleed (unless bonded)

- Not widely used

- More solvent consumption
  Setup more complex

Summary


1. PREPARATION
Wash & Pack
Paper Disc
Slurry
(Support +
+ Liquid Phase)
Glass Wool
2. SAMPLE INTRODUCTION & ELUTION
ISOCRATIC
GRADIENT
3. DETECTION & RECOVERY
Visual Detection
Refractive index
4. ADVANTAGES & LIMITATIONS
ADVANTICES
Polar/Ionic
Less Tailing
Biomolecules
LIMITATIONS
Bleeding
Not Widely Used
Fraction Collection
Complex Setup / More Solvent

Assessment

1. Partition column chromatography is based on the principle of:

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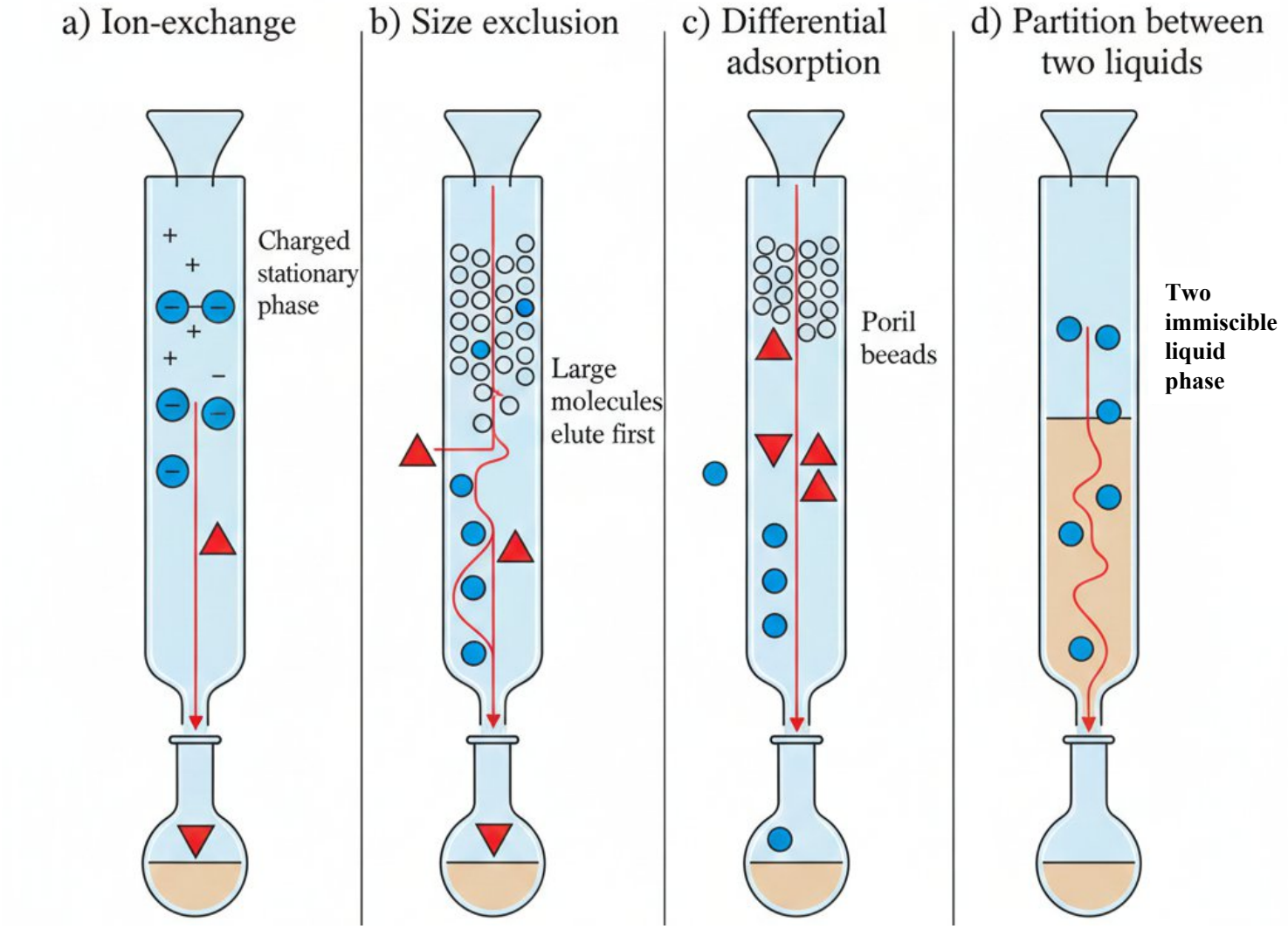

Assessment

2. In partition column chromatography, the stationary phase is typically a:

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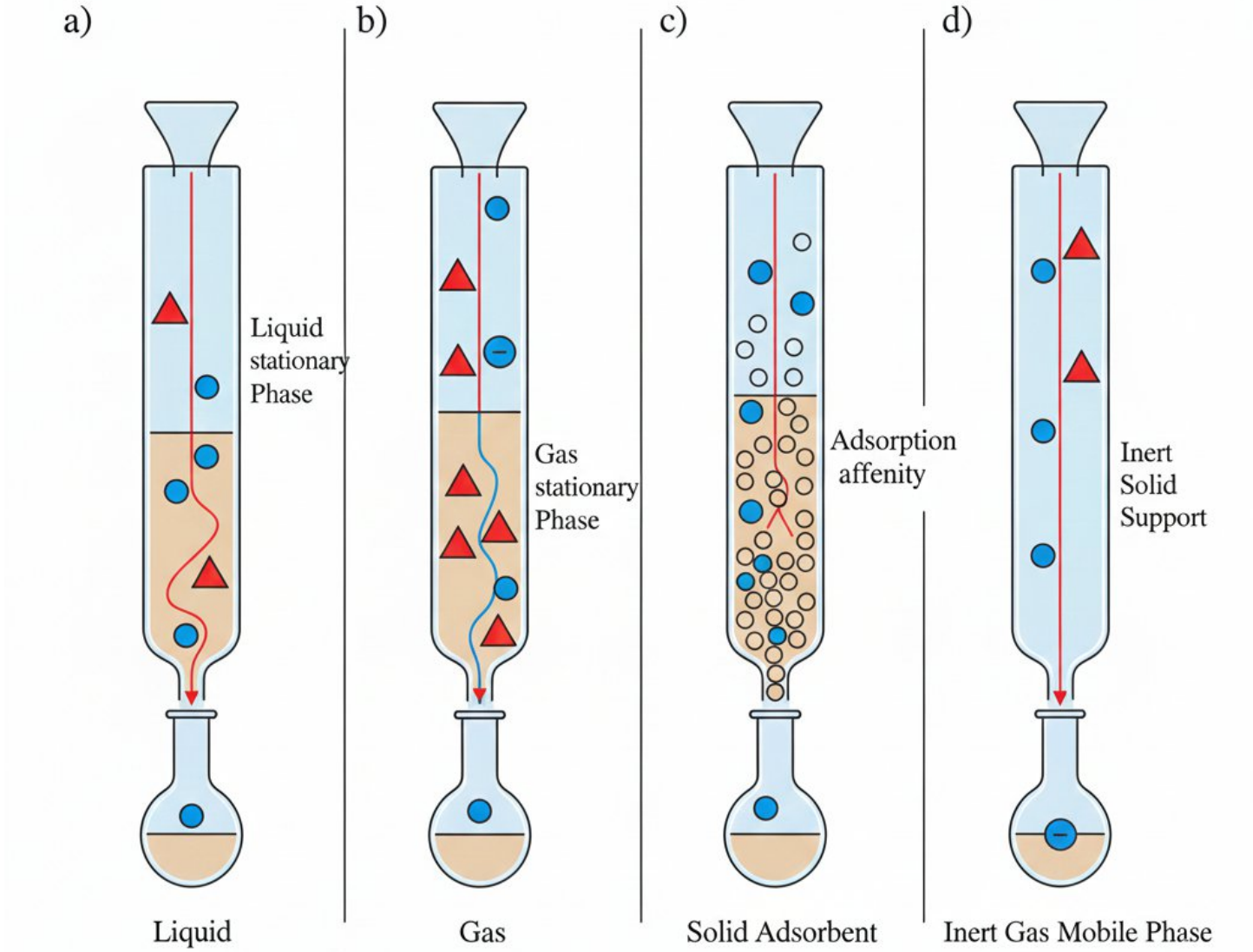

Assessment

3. The mobile phase in typical partition column chromatography is:

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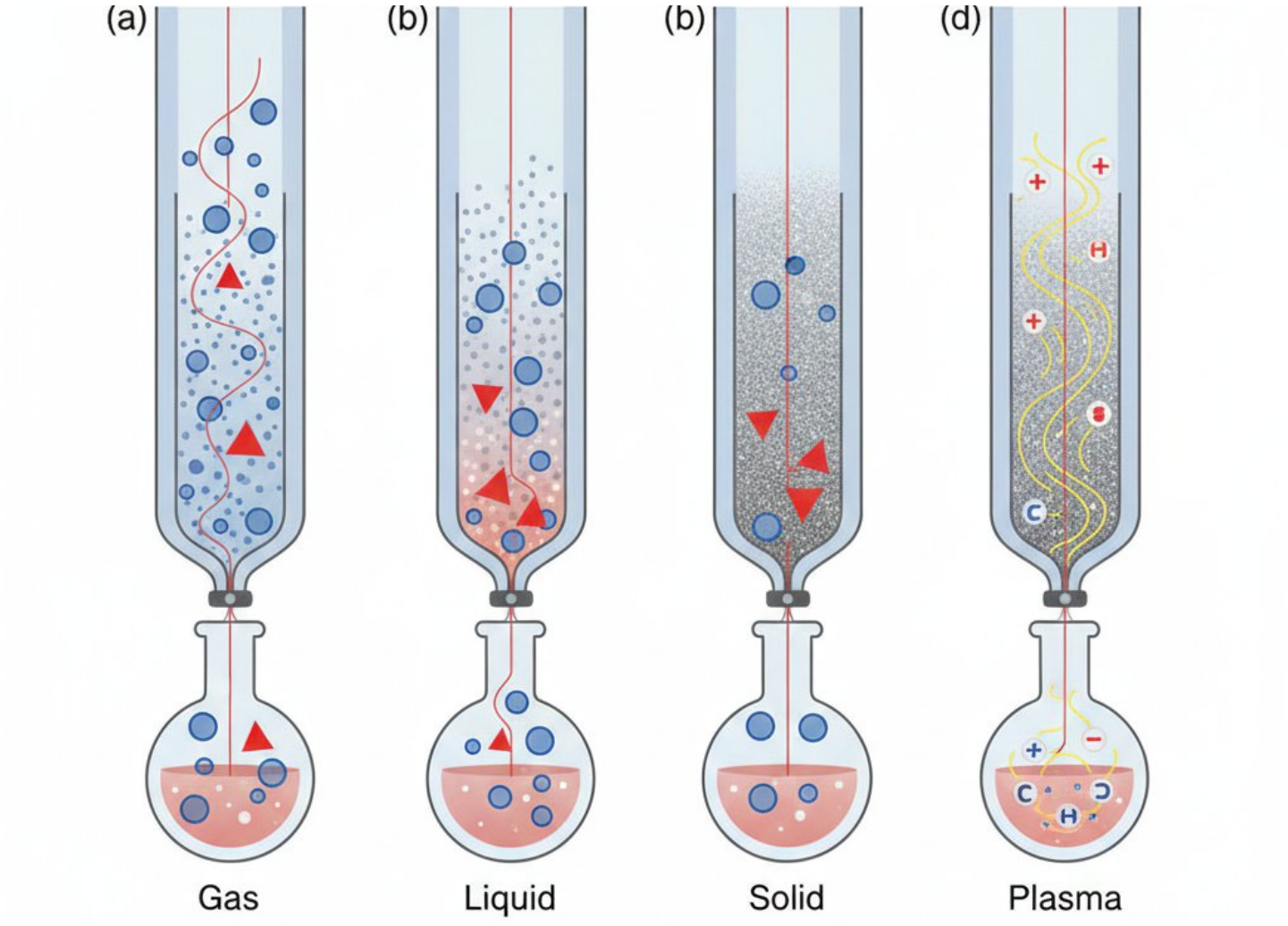

References

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Thank you!