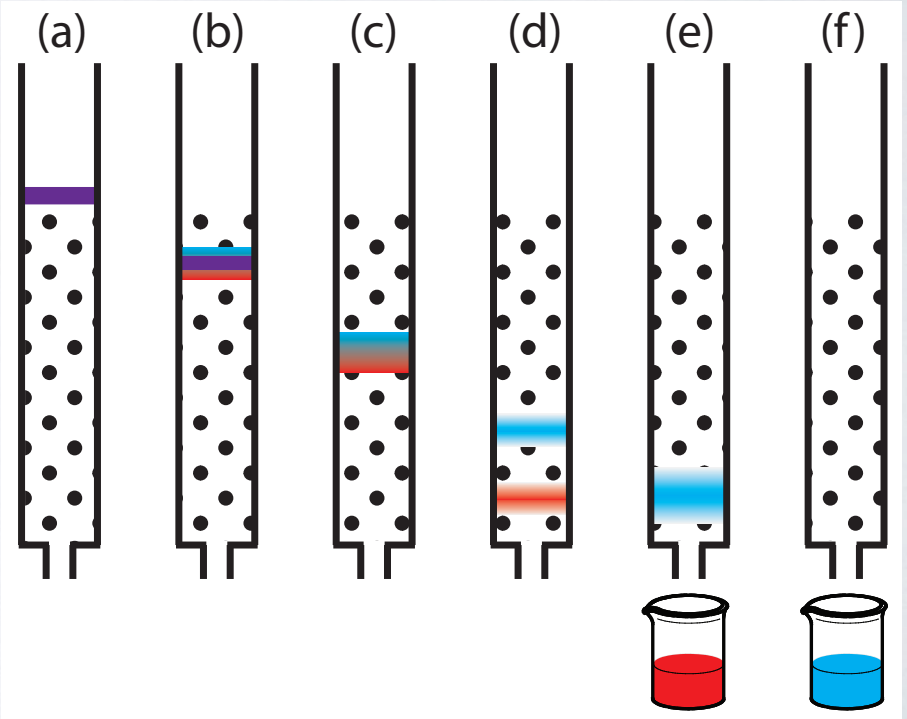
CHROMATOGRAPHY BASICS

SDSU CHEM 251

CHROMATOGRAPHY

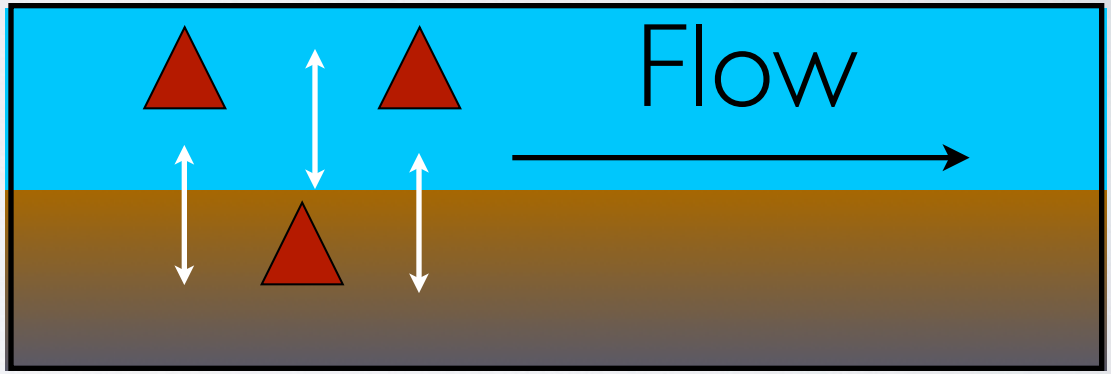
- Chromatography is the term describing all forms of **chemical separations** that involve moving the analyte mixture through a column or over a stationary phase.
- As the plug of analytes moves down the column physical and/or chemical **differences between analytes** cause them to move at different rates, separating them by the end of the column.

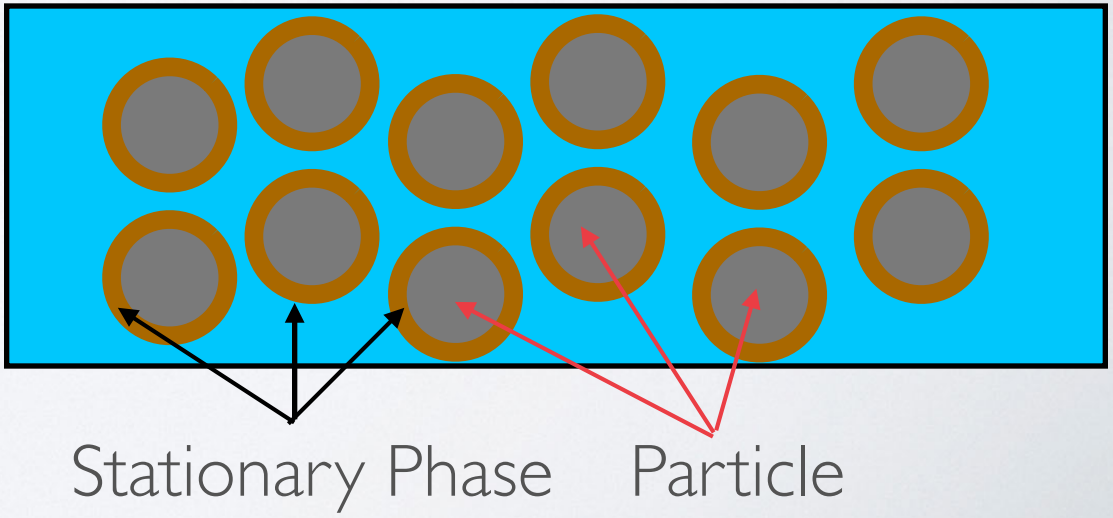
Separation of a mixture of dyes on a packed column



MOBILE & STATIONARY PHASES

- In chromatography we differentiate between the mobile and stationary phases.
- The mobile phase is the flowing solvent (liquid or gas) that moves down the column and carries the analytes to the outlet.
- The stationary phase is fixed to the surface of the column, or the surface of particles inside the column.
- When analytes are stuck to (in) the stationary phase they do not move down the column.





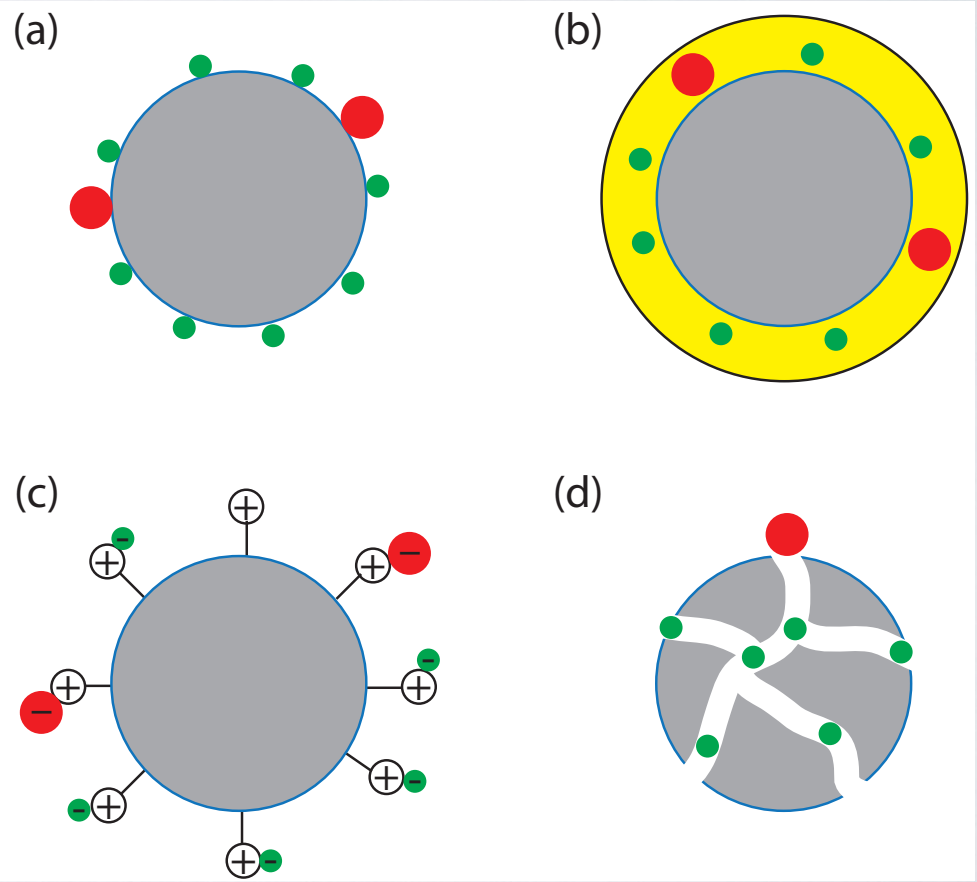
TYPES OF STATIONARY PHASES

a) **Adsorption** to a solid surface

b) **Partition** into a liquid phase

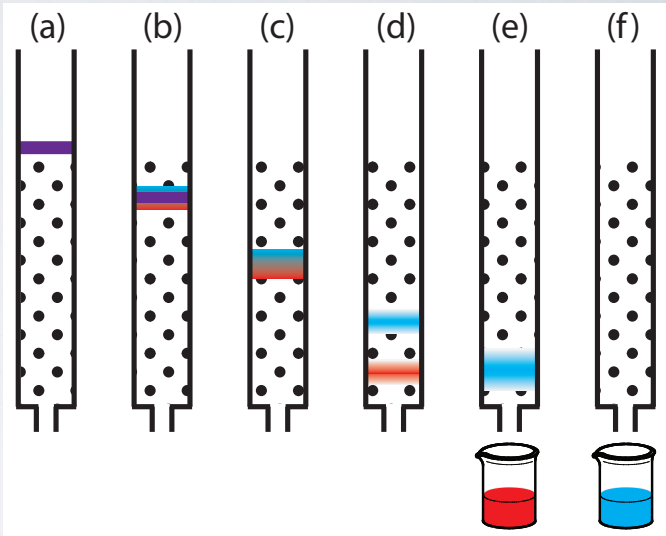
c) **Ion exchange**

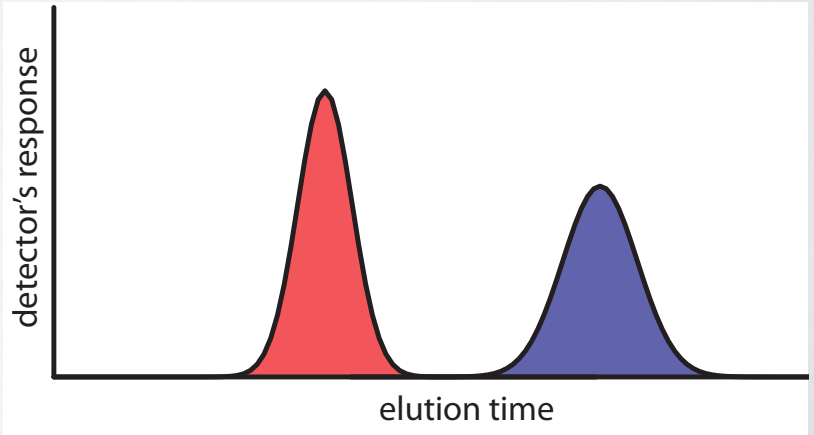
d) **Size Exclusion**



CHROMATOGRAMS

- Chromatograms are the **graphical representations** of the separation that are obtained by **monitoring the chemicals coming out** of the column.
- Many **physical traits** can be measured, such as absorbance, fluorescence, conductivity,…
- The key is to find a physical trait that can **differentiate the analyte from the mobile phase**.





RESOLUTION

- Analytical chemists are often concerned with wether or not two analytes are separated from each other.
- This is measured in terms of **resolution**.
- If the resolution between two analytes is **less than 1.5** they are **not fully resolved**.

$$R_{AB} = \frac{t_{r,B} - t_{r,A}}{0.5(w_B + w_A)}$$