

* Give three types of Open tubular Column in Gas Chromatography

Capillary Column are broadly classified into three types:

- i - The wall coated open tubular (WCOT)
- ii - The support coated open tubular (SCOT)
- iii - The porous-layer open tubular (PLOT)

* Differentiate b/w Gradient elution & isocratic elution?

isocratic elution

&

Gradient elution

→ it's a term used in Chromatography when the mobile phase has constant concentration

it's a term used in Chromatography when the mobile phase has varying concentration.

→ Mobile phase has constant concentration

mobile phase has varying concentration.

→ Peak of late elution is flat & broad

Narrow

→ Selectivity does not depend on column dimensions.

Depends on column dimensions.

* Section Criteria for Gas in GC.

In Gas chromatography, carrier gases are used to move the solute through the column.

Carrier gases should be pure (>99.9 percent), chemically inert, readily available at low cost, safe & suited for the sample being analyzed & the detector being used.

* Merits & Demerits of Derivatives by Alkylation?

Alkylation is a process in which alkyl group is added to a molecule.

Merits

&

Demerits

- | | |
|--|--|
| i- Increased molecular diversity. | i- potential environmental impact |
| ii- High yield & efficiency. | ii- Safety concerns with reactive alkylating agent |
| iii- Versatility in substrate selection. | iii- Formation of by-products & waste. |
| iv- Scalability for industrial production. | iv- Challenges in selectivity & control. |

* Three Characteristics for ideal Reference electrode.

i - Stability :

An ideal reference electrode should maintain a constant & reproducible potential over time.

unaffected by changes in Temp, pH & other environmental factors.

ii - Compatibility :

An ideal reference electrode is compatible with both the electrolyte solution & the analyte, ensuring accurate measurements without interfering with electrochemical reactions.

iii - Reversibility :

The electrode should exhibit reversible redox rxn. allowing for rapid e^- transfer kinetics & minimizing potential or irreversibility in the electrochemical sensor / process.

* Principle involve in potentiometric titration?

Potentiometry principle. when the pair of electrodes are placed in the sample solution or analyte, it shows the potential difference between two electrodes by the addition of titrant or by the change in the concentration of ions.

* Name four indicator electrodes?

There are several different kinds of indicators electrodes.

Several metals such as.

Silver
Copper
lead
Cadmium & mercury.

° — Names — °

- i- Silver / Silver chloride electrode ($Ag/AgCl$)
- ii- Calomel electrode (Hg/Hg_2Cl_2)
- iii- Saturated Calomel electrode (SCE)
- iv - Glass electrode.

* Ion Selective Electrodes ?

Disadvantages :-

- i- Interference
- ii- Drift
- iii- Calibration
- iv- Sensitivity
- v- Maintenance.

* Principle of TGA ?

In thermogravimetric analysis, the sample is heated in a given environment (air, N_2 , CO_2 , He, Ar, etc) the change in the weight of the substance is recorded as a function of temperature or time.

* DTA Curves ?

Endothermic are plotted downward ↓
Exothermic are upward ↑.

Similarly,

The temp of the sample is greater for exothermic rxn. than that of reference, for endotherms the sample temp lags behind that of reference.

* Glass Transition Temp.

(vi) Repeated 2020

* HEAT Flux DSC & Power Compensated DSC

Power Compensated DSC, HEAT Flux DSC

i- Sample Holder:

platinum, Aluminium
& Stainless steel pans

platinum, aluminium
& Stainless steel

ii- Sensors:

Temperature
Sensors

platinum resistance thermocouple/
Separate Sensors & Heaters for
both reference & Sample.

Temperature
Sensors

Usually thermo-
couple which are
Same for both Sample
& reference.

iii - Furnace:

Separate block
for both reference &
Sample cell.

One block for
both reference
& Sample cell.

* Name Adsorbent Used
in HPLC.
(Al_2O_3)

- i- Silica gel. (most common)
- ii- bonded silica phases.
- iii- polymer based adsorbent.
- iv- Zirconia
- v- Alumina

* Advantages of HPLC
* Principle of HPLC

(i) (Repeated 2020)