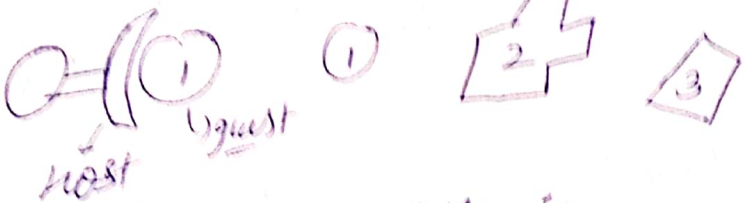
Supramolecular chemistry

1. Supramolecular Assembly
2. Molecular receptor / Molecular substrate :-

1. Receptor
2. Spacer
3. Signal.

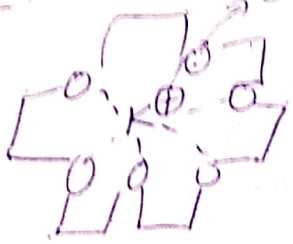


3. Molecular recognition :-

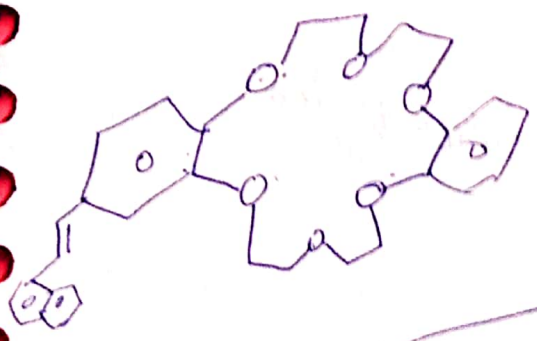
→ Anionic Recognition
→ Cationic Recognition
→ Molecular recognition.

* Cation recognition :-

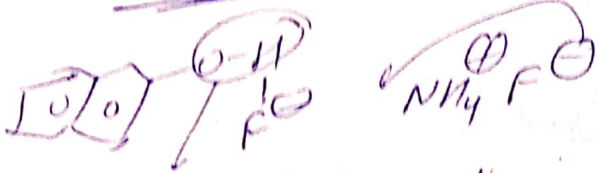
Crown-ether



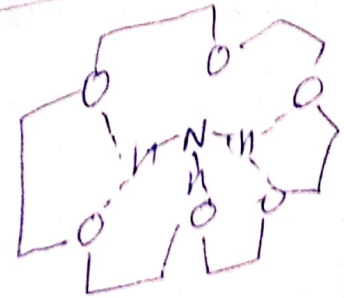
Cationic receptor
18-Crown-ether
18-Crown-6



Anion recognition



Anion recognition
Anion receptor

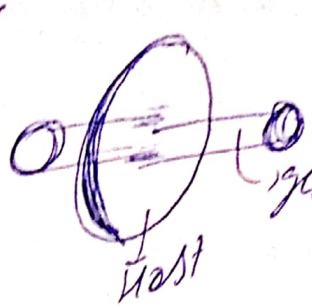


H-bonding Molecular recognition.

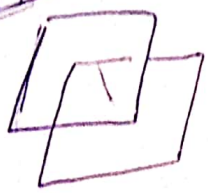
Molecular recognition

18-crown-6

Rotaxane



Inter-locked



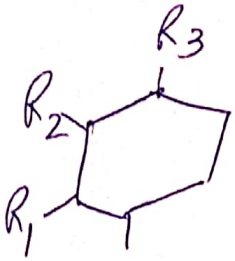
Catenane

molecular ring

Interaction

Molecular machine:-

with change of PH This ring can move to and fro.



Receptor → Supramolecular assembly → Transportation.

Recognition. Transformation

↓

molecular device

Application →

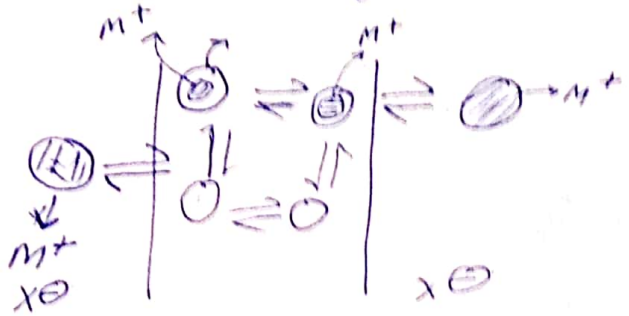
① materials technology. (molecular → supramolecular → material)

② supramolecular catalysis.

③ medicine → Drug delivery

④ Green chemistry ⑤ High-Tech devices
(Solar cells, LED etc)

Transport Process and Carrier design.



To design the

① Transport effect.
② To device the transport process
③ To investigate the application in chemistry and Biology.

☆ Carrier mediated transport process →

① Formation of carrier substrate complex in one interface.
② Diffusion of the complex through the membrane
③ Release the substrate at the other interface.
④ Back diffusion of carrier.

☆ Selective Transport

↓ Internal — from carrier

↓ External — Comes from Medium.

☆ Rate depends on the thermodynamic eqⁿ of both the interfaces.

Transport :-

→ Carrier → (1) High Selectivity
(2) High stability.
(3) Slow Diffusion and exchange Rate.

Ion Transport

(1) Cation (2) Anion (3) Molecule.

↓ Crown ether etc macrocyclic macrobicyclic Compounds

↓ Carriers

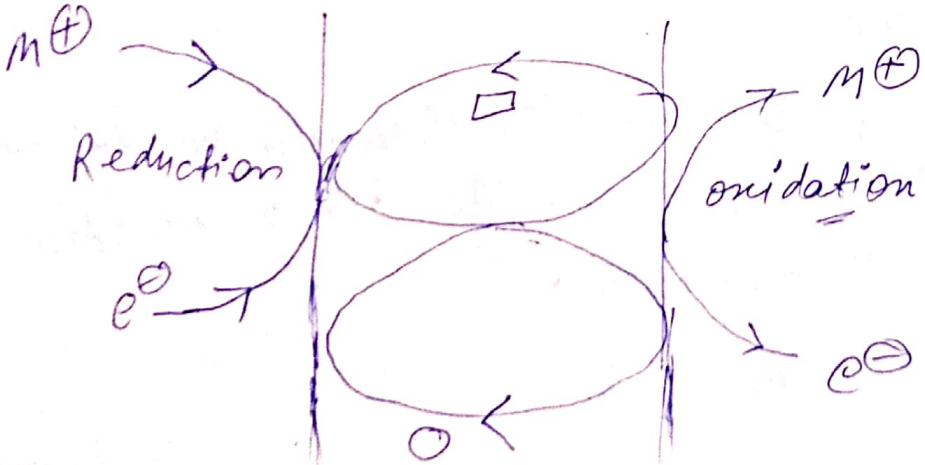
↓ $NH_4^{\oplus}$ or $R\text{-}NH_3^{\oplus}$

↓ Carriers

Coupled Transport Process ⇒

different reduction Pot. or Redox grad.

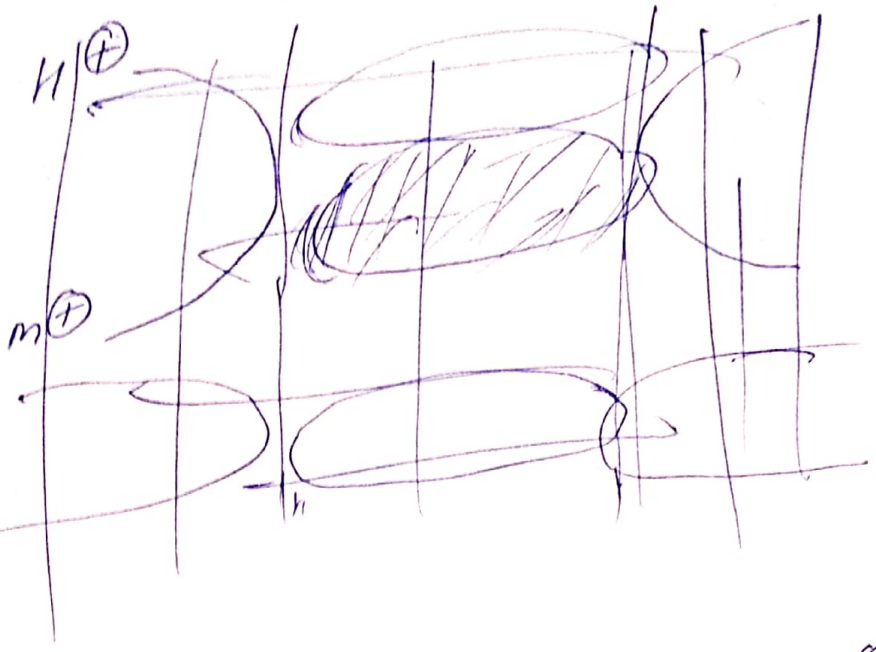
(1) Electron coupled transport in redox gradient.

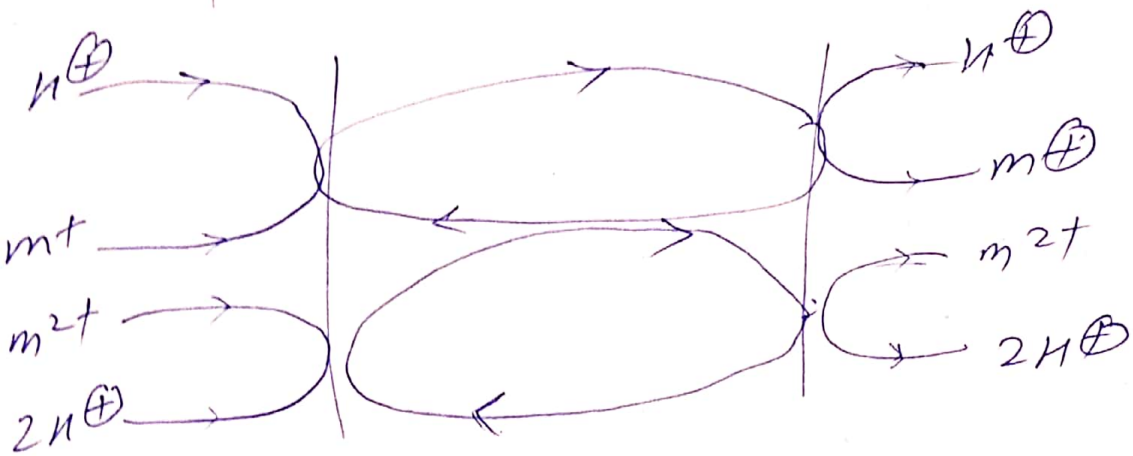


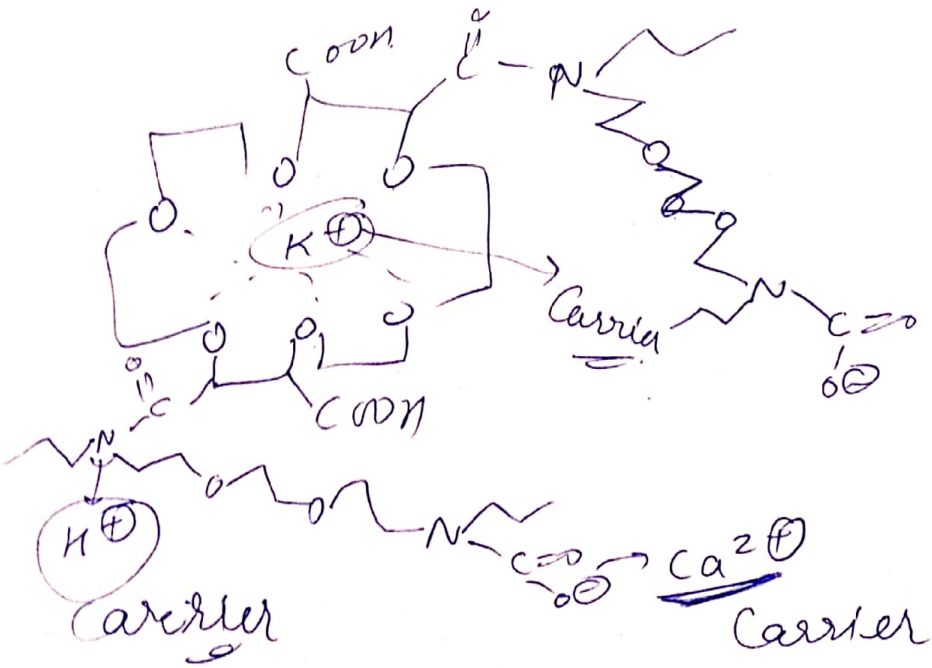
□ → metal ion carrier, macrocycle Ligand ex → 18-crown-[6] 600 K+

○ →  → do $e^{\ominus}$ transport

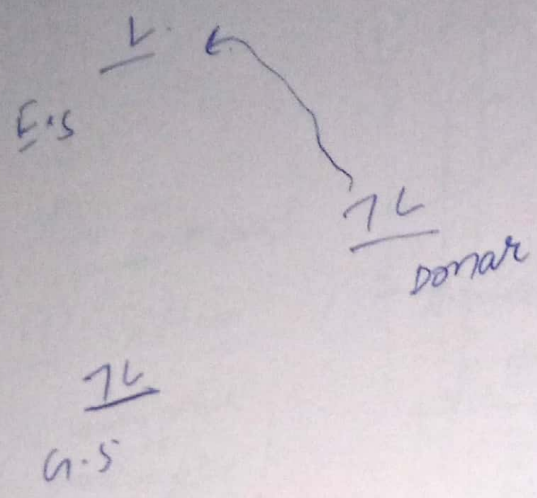
(2) Proton coupled transport Process ⇒ act via PH gradient







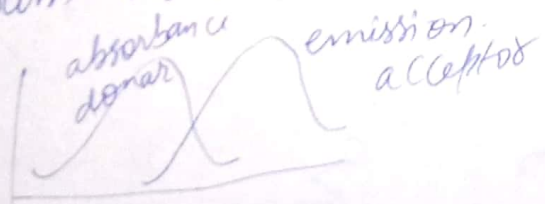
e⊖ transfer

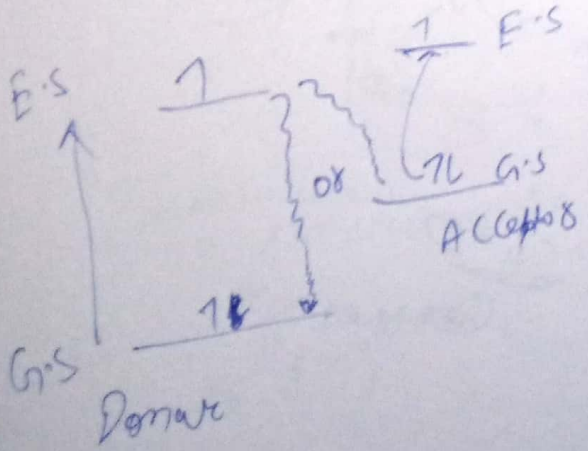


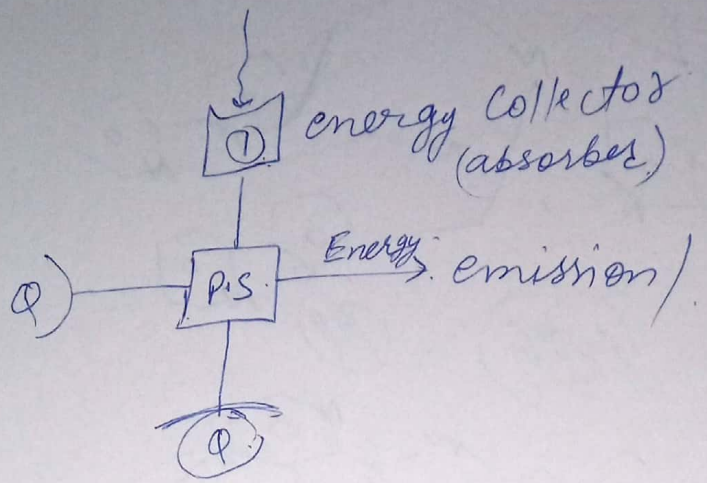
Energy transfer →

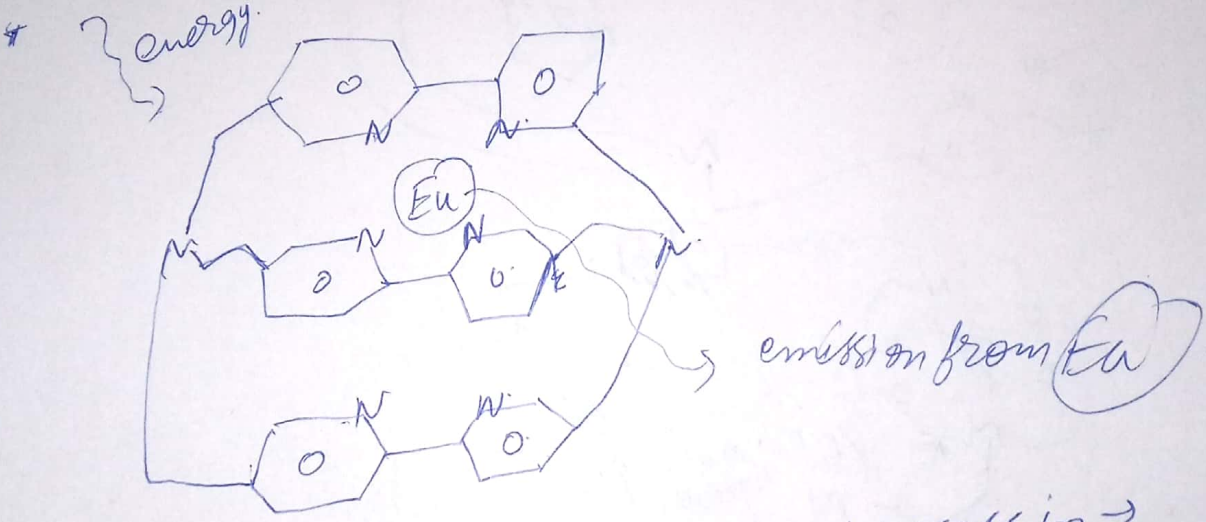
1. Dexter
2. Foster

* Minimum overlap

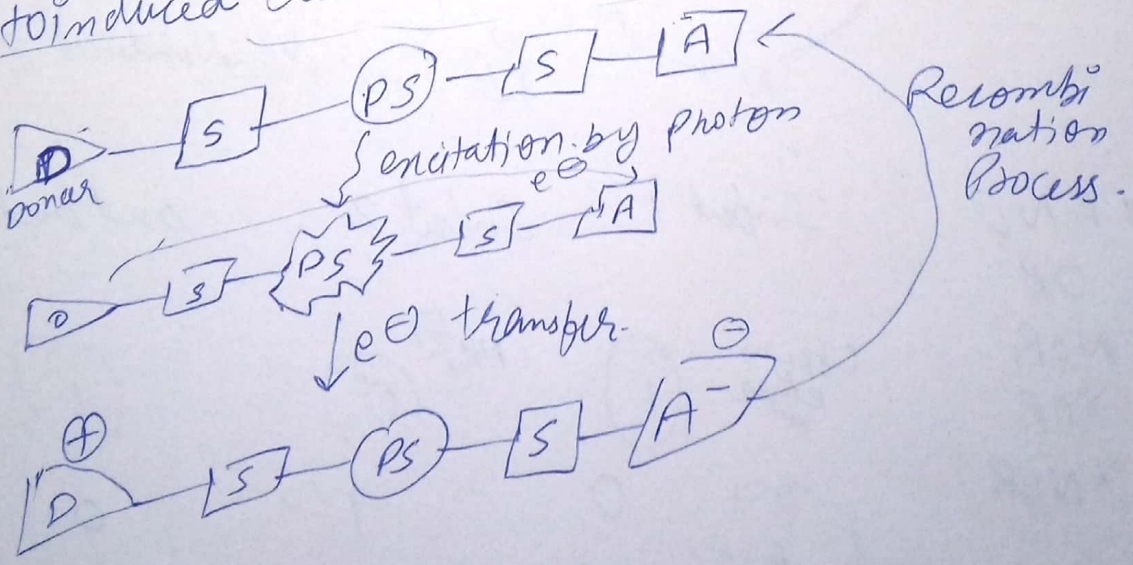




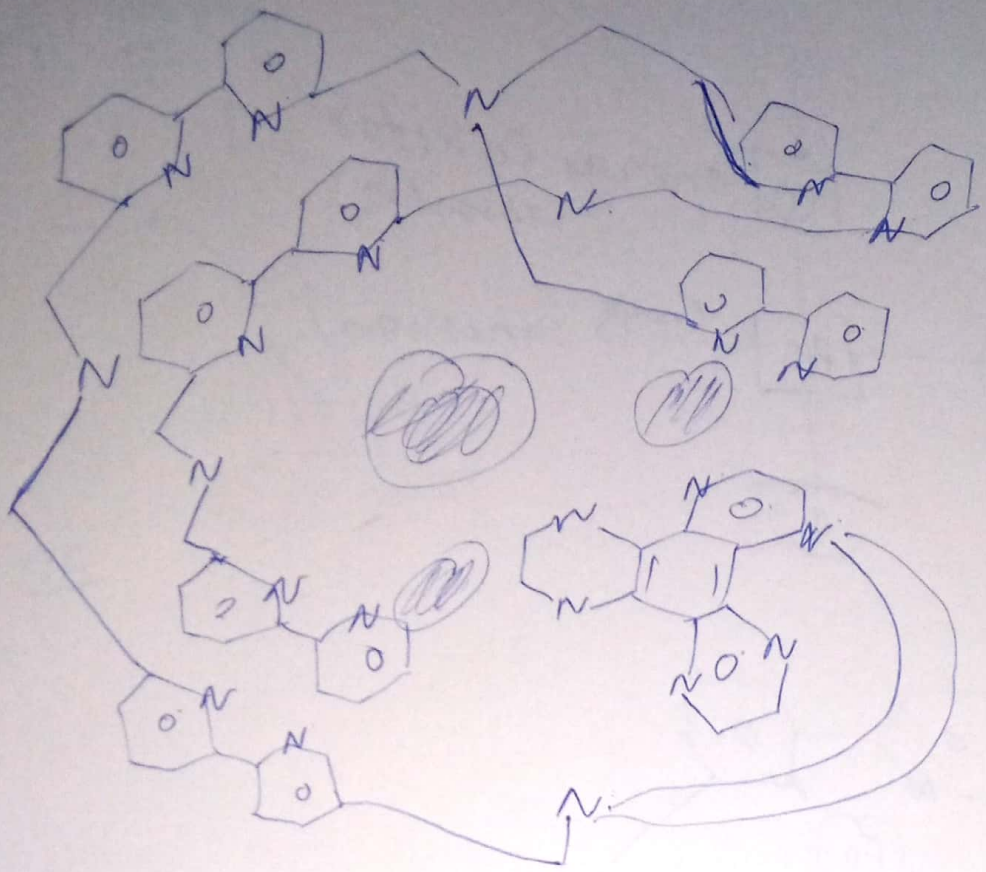


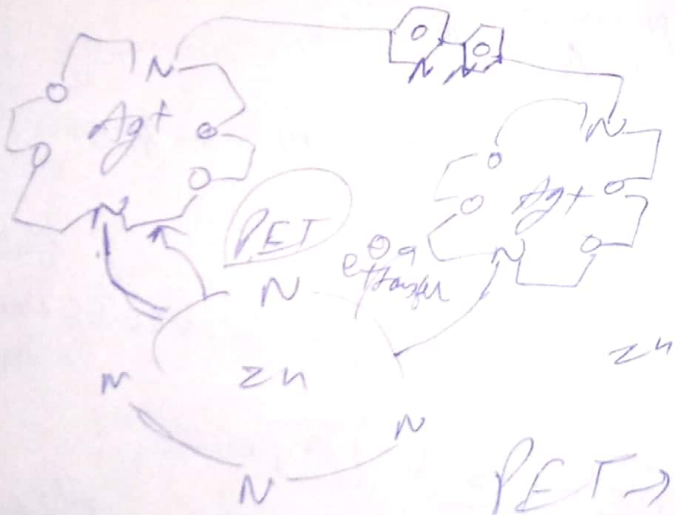


Photoinduced electron transfer process in →



example → Bi-pyridal ligands.





Zn-Porphyrin

PET → Photoinduced e⊖ transfer

	Input 1	Input 2	output
# AND			
# OR			
# NOR			
# XOR			
# XNOR