

ASSIGNMENT- Reggio knock to credit (6)

(with H₂O)

(with HCl/H₂SO₄)

(Ca²⁺, Mg²⁺, Fe³⁺, Al³⁺, Mn²⁺, Cu²⁺, Zn²⁺, Ni²⁺, Cd²⁺)

slot: FI 010000 do not change in below eqns

Course: CHY1004. do not change below the given

Q) a) The three important industrial methods to convert hard water to soft water are

1) Cold and hot lime soda process

2) Permuntit and zeolite process

3) Ion-exchange or demineralization process

The solution required for converting hard water to soft water in ion exchange resin is dil H₂SO₄ / HCl. in regeneration of

Schematic representation of Regeneration

Ca & Mg & waste water

Other multivalent cations.

RESIN

(Calcium & Mg)

Brine
(Na & K)

Q) When I found organic contaminants in water, I use

Absorption (effective)

Electrodialysis methods:

process involved in separation of organic contaminants by using activated carbon is

* A particle of activated carbon is composed of complex network of pores that can be divided into two classes w.r.t size: Macro pores and Micropores

* Surface sites associated with the functional groups constitute a small portion of total surface area of activated carbon by participating in chemisorptive interactions or forming specific adsorption sites.

② a) Nitrocellulose have higher T_g and more fibrous. because in nitrocellulose bulky groups and side chains are there when compared to cellulose, which restricts the rotational motion so, Glass transition temperature is high in Nitrocellulose.

Nitrocellulose have parallel arrangement by resembling crystal with H-bonding which increases the fibre character in Nitrocellulose.

② b) Given that,

$$\text{Molecular weight of polymer} = 1.31 \times 10^5 \text{ g/mol}$$

$$\times \text{Molecular weight of monomer acrylonitrile} = 53.064 \text{ g/mol}$$

$$\text{Degree of polymerization} = \frac{\text{MW of polymer}}{\text{MW of monomer}}$$

$$= \frac{1.31 \times 10^5}{53.064}$$

$$= 2468.7$$

③ a) PEM fuel cell

i) It is a specially treated material that enables it to conduct the charged ions.

These are embedded in a polymer electrolyte membrane

having a $-[F_2C-CF_3]^n$ with attached RSO_3 groups.

Eg: Nafion.

Solid acid fuel cells.

Developed for high temperature applications

Capable of transporting negative oxygen.

Eg: Zirconia.

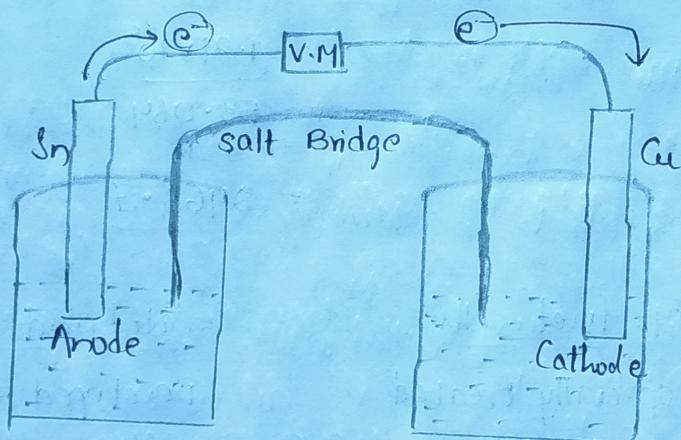
③ b) Given that,

$$E^\circ_{Sn^{+2}/Sn} = -0.13V$$

$$E^\circ_{Cu^{+2}/Cu} = 0.34V$$

If Sn & Cu are in molten state then we can't decide which is cathode & which is anode, based on standard electrode potentials, but now they are in metallic state only, so,

Sn is anode & Cu is cathode



c) Chemical sensors usually contain 4 main parts

1) Receptor → Based on Analyte receptor chemicals are decided

4) Computer
↑ display

Reactor: Analyte + Receptor chemicals

2) Transducer

observation

See the changes in the reaction

process

3) Electronics

Signals

The selectivity and sensitivity occurs in the part of
Transducers of chemical sensors.

Specific conductance of metals decreases with increasing
temperature, whereas semiconductors tend to increase
their conductance with high temperature.

The well-known semiconductors thermistors react
sensitively to small temperature differences.