

## Surface Chemistry

## Self Evaluation Test -14

- In which of the following commercial processes a catalyst is not used [CPMT 1989]
  - Haber's process
  - Deacon's process
  - Solvay process
  - Lead chamber process
- A catalyst [IIT 1984; AFMC 1995; CBSE PMT 1995]
  - Increases the average kinetic energy of reacting molecules
  - Increases the activation energy
  - Alters the reaction mechanism
  - Increases the frequency of collisions of reacting species
- The coagulation of 100 ml of a colloidal sol of gold is completely prevented by addition of 0.25 g of a substance 'X' to it before adding 10 ml of 1% NaCl solution. The gold number of 'X' is
  - 0.25
  - 25
  - 250
  - 2.5
- Which one of the following is not a property of hydrophilic sols
  - High concentrations of dispersed phase can be easily attained
  - Coagulation is reversible
  - Viscosity and surface tension are about the same as for water
  - The charge of the particle depends on the pH values of the medium; it may be positive, negative or even zero
- Peptising agent is
  - Always an electrolyte
  - Always a non-electrolyte
  - Electrolyte or non-electrolyte
  - A lyophilic colloid
- The catalyst used in the manufacture of methanol from water gas is [MP PET 2002]
  - $V_2O_5$
  - $Ni + Mo$
  - $ZnO + Cr_2O_3$
  - $Pt + W$
- Organic catalysts differ from inorganic catalysts [AFMC 1989]
  - By acting at very high temperature
  - By acting at low temperature
  - Being used up
  - Being proteinous in nature
- Commercial detergents mainly contain [CPMT 1993]
  - $RCOONa$
  - $RONa$
  - $RSNa$
  - $ROSO_2Na$
- In which of the following processes shape-selective catalysis is occurring
  - Conversion of alcohol to gasoline
  - Synthesis of methanol from CO and  $H_2$
  - Polymerisation of ethylene
  - Synthesis of ammonia
- Which one of the following is used for reviving the exhausted permutite [EAMCET 2003]
  - HCl solution
  - 10%  $CaCl_2$  solution
  - 10%  $MgCl_2$  solution
  - 10% NaCl solution
- The ability of a catalyst to accelerate the chemical reaction is known as [CPMT 2000; KCET 2000]
  - Selectively
  - Activity
  - Negative catalyst
  - None of these
- $AlCl_3$ , in reactions, acts as
  - Oxidizing agent
  - Reducing agent
  - Acid catalyst
  - None of these
- On addition of one ml of 10% NaCl solution to 10 ml gold sol in the presence of 0.25 gm of starch. The coagulation is just prevented, starch has gold number [MP PET 2004]
  - 0.025
  - 0.25
  - 2.5
  - None
- Milk is an example of [MP PET 2001; JIPMER 2002; MP PMT 2002,04]
  - Pure solution

(b) Gel

(c) Emulsion

(d) Suspension

# AS Answers and Solutions

(SET -14)

1. (c) In Haber's process we use iron as a catalyst, In Deacon's process we use  $Cu_2Cl_2$  as a catalyst and in lead chamber process we use  $N_2O_5$  as a catalyst but in solvay process no catalyst is used.
2. (d) A catalyst can increase the rate of reaction and hence increases the frequency of collision of reacting species.
3. (b) 250 mg of X is present in 100 ml of colloidal sol of gold. By definition, gold no. of X is that amount of it in mg which is present in 10 ml of colloidal gold solution. Hence in 10 ml, the amount of X present is 25 mg which is the gold number of X.
4. (c) Viscosity and surface tension are not same for water in hydrophilic sols.
5. (a) Process of converting precipitate into colloidal particles by adding suitable electrolyte called peptisation and stabilizing agent (electrolytes) as peptizing agent.
6. (c)  $[CO + H_2] + H_2 \xrightarrow{ZnO + Cr_2O_3} CH_3OH$
7. (d) Organic catalyst are proteinous in nature and obtain from living cell.
8. (a) Commercial detergents mainly contain salts of higher fatty acids.
9. (a,c) Shape selective catalyst are zeolites and zeolites are aluminosilicates of general formula  $M_{x/n}[(AlO_2)_x \cdot (SiO_2)_y] \cdot mH_2O$ . Zeolites are used in conversion of alcohol to gasoline and in polymerisation of ethylene.
10. (d) 10% NaCl solution is used for reviving the exhaust permutite.
11. (b) The ability of a catalyst to accelerate the chemical reaction is known as its activity. Degree of acceleration can be as high as  $10^{10}$  times in certain reactions.
12. (c)  $AlCl_3$  may be written as  $Al^{+3}Cl^-$  and all the tri-positive ions are Lewis acid hence it can be acts as acid catalyst.
13. (d)  $0.25 \times 1000 = 250$
14. (c) Milk is the example of emulsion of fat globules in water.

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