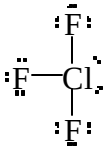
2001-N-2

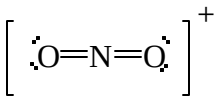
- 2.6×10^{-15} M^{-1}
  91 kJ mol^{-1}
  7200 K

2001-N-3

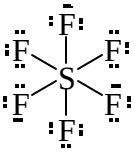
-



T-shaped sp^3d



linear sp



octahedral sp^3d^2

2001-N-4

- $NaOH(s) \rightarrow Na^+(aq) + H_2PO_4^-(aq)$ $\quad -35$ kJ mol^{-1}
  $H^+(aq) + OH^-(aq) \rightarrow H_2O$ $\quad \Delta H = -59$ kJ mol^{-1}

  Confirms Hess's Law. ΔH is the sum of the above 2 equations.

- Formation of ammonia is favoured by low temperature. High temperature is required to make reaction proceed at a useful rate. These two factors must be balanced to find the optimum temperature to run the process.

2001-N-5

- 1×10^5
  At the higher concentrations, intermolecular attractions become significant and the osmotic pressure is less than expected.
- –2.06 °C

2001-N-6

- Excess H^+ is removed by: $HPO_4^{2-} + H^+ \rightarrow H_2PO_4^-$
  Excess OH^- is removed by: $H_2PO_4^- + OH^- \rightarrow HPO_4^{2-} + H_2O$

  pH = 7.20 Max buffering capacity when [base]=[acid] and pH = pK_a

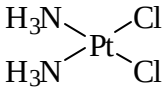
  0.33

- 7.1×10^{-4} M

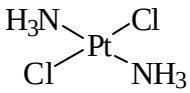
2001-N-7

- Structural isomerism - the metal is bonded to different atoms.
  eg (coordination sphere isomerism) $[Cr(H_2O)_6]Cl_3$ and $[Cr(H_2O)_5Cl]Cl_2 \cdot H_2O$
  eg (linkage isomerism) $[Co(NH_3)_5(ONO)]Cl_2$and $[Co(NH_3)_5(NO_2)]Cl_2$

  Geometric isomerism - the spatial arrangement of the ligands is different.
  eg

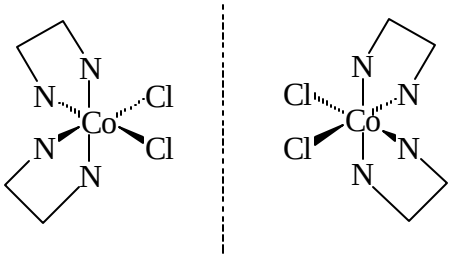


cis-isomer



trans-isomer

  Optical isomerism (enantiomers) - non-superimposable mirror images
  eg



cis-isomer

- 2×10^{-12} M

2001-N-8

- 0.0239 V

  $PvH_2^- + Asc^- \rightleftharpoons Pv^- + AscH_2^-$

  +0.166 V

2001-N-9

- 6.9×10^{-6} s

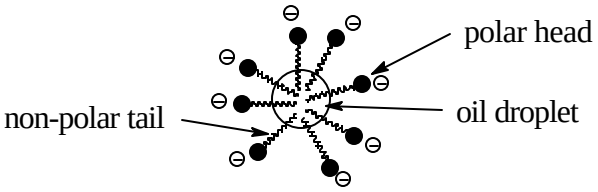
- 1.49×10^{5} s^{-1}

2001-N-10

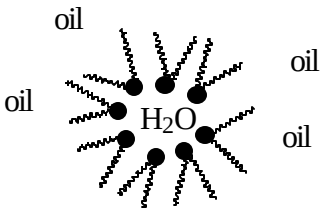
- The X radicals are regenerated in the overall sequence, so ozone is depleted but the ozone destroying radical is not.

- The grease removing capabilities of the water are dependent on the concentration of the soap micelles in the water. The bubbles are not part of the cleaning system.

- Sodium oleate has 1 non-polar tail. Magnesium oleate has 2 non-polar tails. The shape of magnesium oleate makes it easier to form inverse micelles.



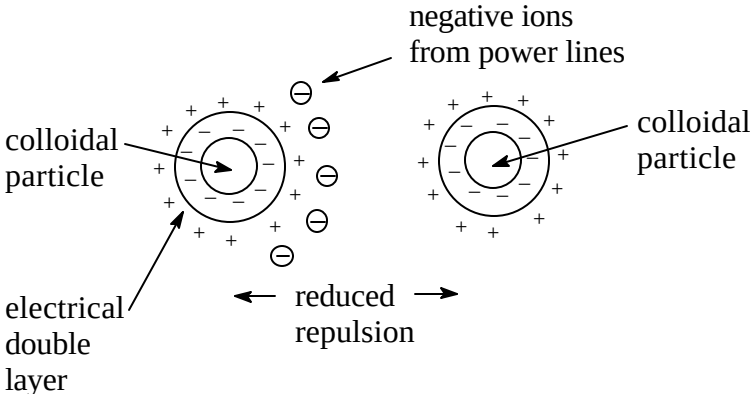
hydrophobic centre



hydrophilic centre

2001-N-11

The negative ions cause the colloidal particles with positively charged outer layers to come closer together by reducing the inter[particle repulsions. This eventually leads to coagulation of the particles.



$^{100}_{42}\text{Mo} \rightarrow 2\ ^{0}_{-1}b + {}^{100}_{44}\text{Ru}$

2001-N-12

Odd numbered nuclei are less stable than even number nuclei - hence the zig-zag nature of curve. Heavier elements are synthesised from lighter ones and hence are less abundant.

Fe (atomic number 26) is the most stable nuclide and hence has a higher than expected abundance. It has a stable A/Z ratio of approximately 2 and a very high binding energy.