Chemistry 1Adv/1SSP (Chem1902/1904) November 2002

2002-N-2

- tetraamminedichlorochromium(III) chloride-2-water

  $[CrCl_2(NH_3)_4]^+$

  Cl N

  $3d^3$

- $[Cu(NH_3)_4]^{2+} + 4H^+(aq) \rightarrow Cu^{2+}(aq) + 4NH_4^+(aq)$

  $4KO_2(s) + 2H_2O \rightarrow 4K^+(aq) + 4OH^-(aq) + 3O_2(g)$

  $Cd^{2+}(aq) + H_2S(g) \rightarrow CdS(s) + 2H^+(aq)$

  no reaction

  $Zn^{2+}(aq) + 4OH^-(aq) \rightarrow [Zn(OH)_4]^{2-}(aq)$

2001-N-3

- 1×10^{-5} M

  2.8×10^{-17} M

2002-N-4

- III i.e. Fe^{3+}
- The potential will decrease. The Cu cell is undergoing reduction:

  $$Cu^{2+} + 2e^- \rightarrow Cu$$

  The addition of H_2S precipitates CuS and reduces the concentration of Cu^{2+}.

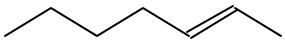
  $$Cu^{2+}(aq) + H_2S(g) \rightarrow CuS(s) + 2H^+(aq)$$

  From the Nernst equation: $E = E^\circ - \frac{RT}{nF} \ln \frac{[Zn^{2+}]}{[Cu^{2+}]}$, if $[Cu^{2+}]$ drops the value of E will drop accordingly.

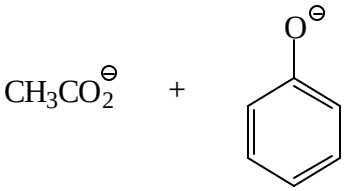
  Or from Le Chatelier's principle, removal of Cu^{2+} ions will cause the redox reaction to oppose this change and try and generate more Cu^{2+}, i.e. the potential will drop.

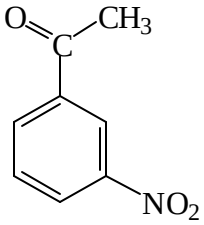
2002-N-5

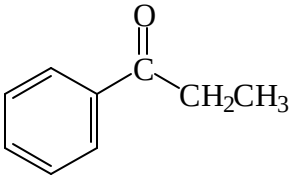
•



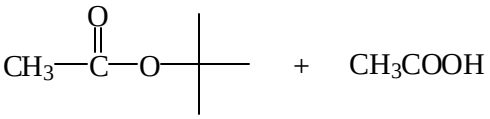
2-heptene

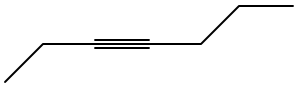






1-phenylpropanone

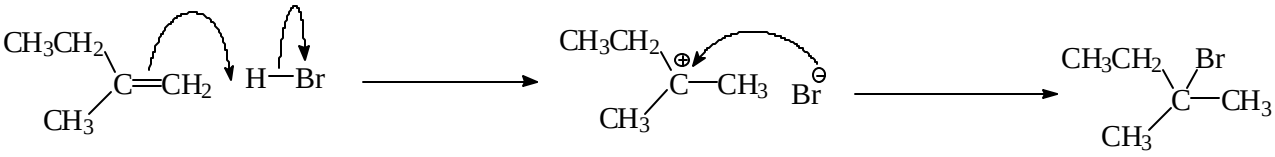




3-heptyne

2002-N-6

•

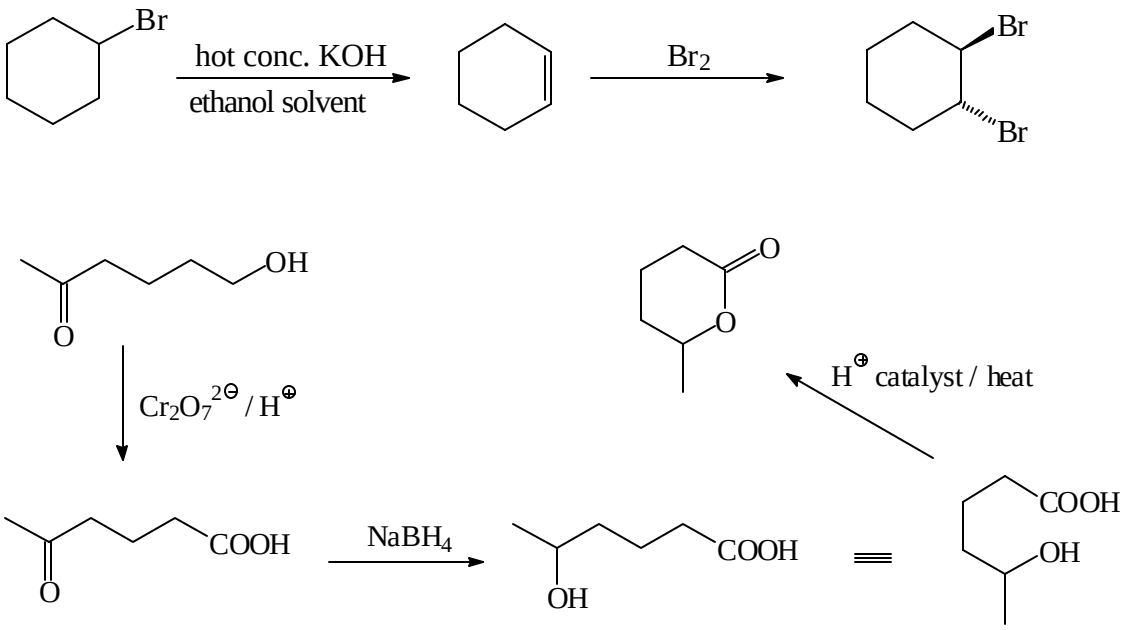


The intermediate formed is the more stable tertiary carbocation. It is formed in preference to the less stable primary carbocation, which would lead to the primary alkyl bromide.

achiral compound

2002-N-7

•



2002-N-8

• $C_{20}H_{34}O_5$

carboxylic acid, ketone, alcohol, alkene

4

32