Chemistry Class 11 NCERT Solutions: Chapter 8 Redox Reactions Part 15

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Q: 29. Given the standard electrode potentials,

$K^+/K = -2.93V, Ag^+/Ag = 0.80V,$

$Hg^{2+}/Hg = 0.79V$

$Mg^{2+}/Mg = -2.37V. Cr^{3+}/Cr = -0.74V$

Arrange these metals in their increasing order of reducing power.

Answer:

The lower the electrode potential, the stronger is the reducing agent. Therefore, the increasing order of the reducing power of the given metals is $Ag < Hg < Cr < Mg < K$.

Q: 30. Depict the galvanic cell in which the reaction $Zn_{(s)} + 2Ag^+_{(aq)} \rightarrow Zn^{2+}_{(aq)} + 2Ag_{(s)}$ takes place, further show:
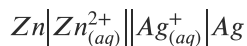
(i) which of the electrode is negatively charged,

(ii) the carriers of the current in the cell, and

(iii) individual reaction at each electrode

Answer:

The galvanic cell corresponding to the given redox reaction can be represented as:
$Zn|Zn^{2+}_{(aq)}||Ag^+_{(aq)}|Ag$

(i) Zn electrode is negatively charged because at this electrode, Zn oxidizes to Zn^{2+} and the leaving electrons accumulate on this electrode.

(ii) Ions are the carriers of current in the cell.

(iii) The reaction-taking place at Zn electrode can be represented as:

$Zn_{(s)} \rightarrow Zn^{2+}_{(aq)} + 2e^-$
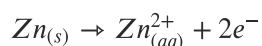
And the reaction-taking place at Ag electrode can be represented as:

$Ag^+_{(aq)} + e^- \rightarrow Ag_{(s)}$