

Assignment - 2

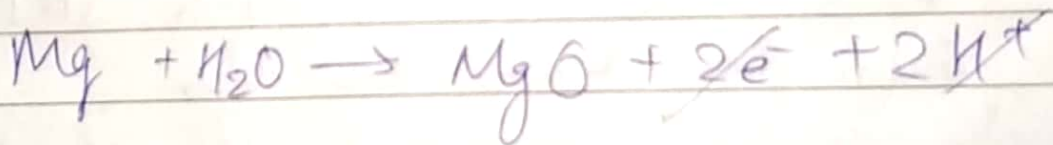
1. Nernst equation

$$E_{ion} = \frac{RT}{Fn} \ln \frac{[K^+]_{out}}{[K^+]_{in}}$$

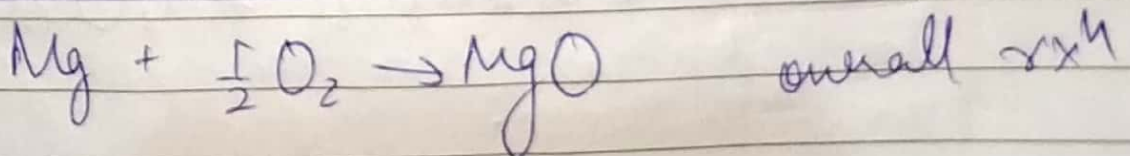
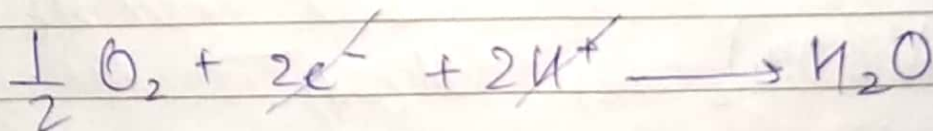
$$= \frac{0.0592}{n} \log \frac{0.008}{0.135}$$

$$V_m = 61.5 \log \left(\frac{S}{150} \right) = -92 \text{ mV}$$

2. Anode oxdn



Cathode reducⁿ

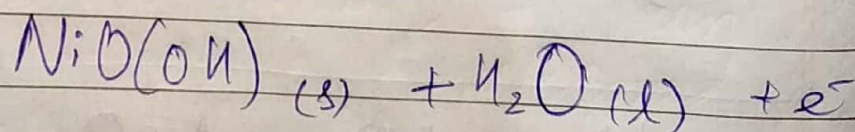
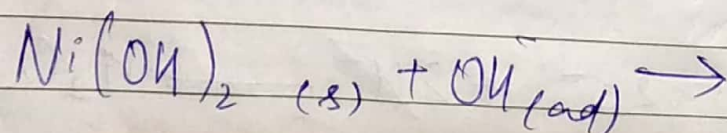


4. Al can be used as a sacrificial anode to protect the iron from corrosion because the std. reduction potential of Al^{3+}/Al is -1.66 V and that of iron is -0.44 V . So attachment of Al to Fe prevent rust formation.

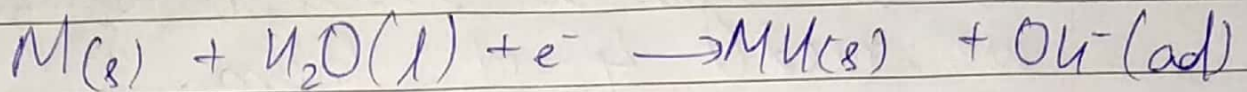
5. (a) The lithium ions are small enough to be able to move through a micro permeable separator. So Li ion batteries are capable to produce more voltage.

(b) It has high energy and energy density due to high SRP value than the other battery.

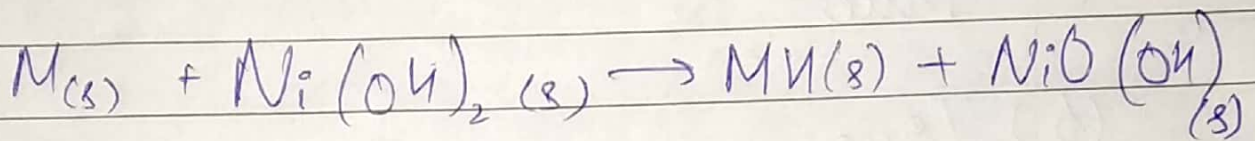
6. Anode oxidation



Cathode reduction



Overall



7.(c) The H^+ produced in anode chamber moves to cathode chamber through PEM. The protons combine with O^{2-} to form H_2O in cathode chamber.

(d) Ceramic oxides are used as electrolyte in SOFC.

8. Charging and discharging of an electron is the non expansion work done by the battery.

9. As one alkaline battery provides 1.5V so to light a flashlight of 6.0V, we need 4 of them.

10.

(a) True

(b) True

(c) True

(d) False

(e) True

(f) True

11. Signals are processed almost exclusively by means of electrical instrumentation, every sensor should include a transducing function i.e. the actual concentration value, a non electric quantity must be transformed into an electric quantity, voltage, current or resistance.

12. Two major components of a chemical sensor are:—

- (i) Chemical molecular recognition system (receptor)
- (ii) A physiochemical transducer.

13. Glucose oxidase a biosensor is used as a receptor in a glucometer.

14. Between receptor and analyte, receptor layers can respond selectively to particular substances as to a group of substances (analytes) the term molecular recognition is used to describe this behaviour.

15. Receptor is responsible for selectivity in chemical sensors.