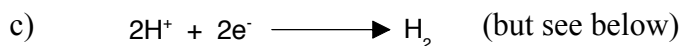


Chemguide – answers

GROUP 7: MANUFACTURING CHLORINE



b) Oxygen, from the release of hydroxide ions from the water. (You may possibly have come across this as a reaction involving the water itself at the electrode forming oxygen, hydrogen ions and electrons. If so, use whichever explanation you have been taught.)



d) Sodium hydroxide solution. There are two ways of explaining this. The one used on the Chemguide page is that when hydrogen ions are released, more water ionises to replace them, and that increases the concentration of hydroxide ions around the cathode – water, of course, producing hydrogen ions and hydroxide ions when it ionises.

The other way of looking at it is as a reaction involving water itself, gaining electrons to form hydroxide ions and hydrogen gas. Again, use whichever you have been taught.

e) Hydrogen and chlorine form an explosive mixture.

f) Chlorine reacts with sodium hydroxide solution.

2. The diaphragm cell

a) titanium

b) chlorine and oxygen

c) They are subjected to high pressures. The chlorine liquefies; the oxygen remains as a gas.

d) hydrogen and sodium hydroxide solution

e) sodium hydroxide solution contaminated with sodium chloride

f) This makes sure that the flow of liquid is from left to right through the diaphragm. That keeps the sodium hydroxide solution being formed in the right-hand compartment from ever coming into contact with the chlorine being formed in the left-hand side.

3. The membrane cell

a) titanium

b) chlorine and oxygen

c) They are subjected to high pressures. The chlorine liquefies; the oxygen remains as a gas.

Chemguide – answers

d) It only allows positive ions to pass through it. That means that no chloride ions can get into the right-hand compartment. That stops the sodium hydroxide produced from being contaminated by sodium chloride.

e) hydrogen and sodium hydroxide solution

f) water

g) pure sodium hydroxide solution

h) used sodium chloride solution