

I dont have practical result data. But i want calculation of ph values of 0.1m hcl, 0.05m hcl, 0.025m hcl 0.0125m hcl by using quinhydrone and calomel electrode and to compare the values of ph with theoretically calculated values.

So plzz answer me as per as u can bcz i have to submit ma project early.

Solution:

1. The quinhydrone electrode potential at 25 degrees Celcius is 0.6992 V and for calomel electrode is 0.2438 V.

We can write the total potential as $E = E(\text{quin. or cal.}) - E(2\text{H}^+/\text{H}_2)$.

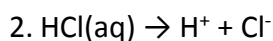
In a respective solution, the potential of the hydrogen electrode will be

$$E = -0.059 \times \lg(\text{H}^+).$$

$$E(\text{quin.}) = 0.6992 \text{ V} - (-0.059 \times \lg(\text{H}^+))$$

or

$$E(\text{cal.}) = 0.2438 \text{ V} - (-0.059 \times \lg(\text{H}^+)).$$



$$\text{pH}(\text{cal.}) = 0.2438 - (-0.059 \times (-1)) = 0.1848;$$

$$\text{pH}(\text{quin.}) = 0.6992 - (-0.059 \times (-1)) = 0.6402;$$

$$\text{pH}(\text{theoretically}) = -\lg(0.1) = 1.$$



$$\text{pH}(\text{cal.}) = 0.2438 - (-0.059 \times \lg(0.05)) = 0.1671;$$

$$\text{pH}(\text{quin.}) = 0.6992 - (-0.059 \times \lg(0.05)) = 0.6225;$$

$$\text{pH}(\text{theoretically}) = -\lg(0.05) = 1.3.$$



$$\text{pH}(\text{cal.}) = 0.2438 - (-0.059 \times \lg(0.025)) = 0.1494;$$

$$\text{pH}(\text{quin.}) = 0.6992 - (-0.059 \times \lg(0.025)) = 0.6048;$$

$$\text{pH}(\text{theoretically}) = -\lg(0.025) = 1.6.$$



$$\text{pH}(\text{cal.}) = 0.2438 - (-0.059 \times \lg(0.0125)) = 0.1317;$$

$$\text{pH}(\text{quin.})=0.6992-(-0.059 \times \lg(0.0125))=0.5871;$$

$$\text{pH}(\text{theoretically})=-\lg(0.0125)=1.9$$

Answer:

1. 0.1m HCl \rightarrow 0.1m H⁺: pH(cal.)= 0.1848; pH(quin.)= 0.6402; pH(theoretically)=1.
2. 0.05m HCl \rightarrow 0.05m H⁺ : pH(cal.)= 0.1671; pH(quin.)= 0.6225; pH(theoretically)=1.3.
3. 0.025m HCl \rightarrow 0.025m H⁺ : pH(cal.)= 0.1494; pH(quin.)= 0.6048; pH(theoretically)=1.6.
4. 0.0125m HCl \rightarrow 0.0125m H⁺ : pH(cal.)= 0.1317; pH(quin.)= 0.5871; pH(theoretically)=1.9.

Answer provided by www.AssignmentExpert.com