

Answer on Question #41856, Chemistry, Physical Chemistry

Question:

Universal indicator was added to dilute aqueous solution of NaCl this solution was electrolysed
What colour would be observed at the cathode and after a short period of time and why?

What does electrolysed mean

Solution:

Electrolysis is the use of electric current to stimulate a non-spontaneous reaction. Electrolysis of aqueous sodium chloride yields hydrogen and chlorine (with aqueous sodium hydroxide remaining in solution).

| pH range | Description | Color | |
|----------|-----------------|---------------|--|
| <3 | Strong acid | Red | $2\text{H}_2\text{O} + 2\text{e}^- = \text{H}_2 + 2\text{OH}^-$ |
| 3-6 | Acid | Orange/Yellow | $2\text{Cl}^- - 2\text{e}^- = \text{Cl}_2$ |
| 7 | Neutral | Green | |
| 8-11 | Alkaline | Blue | $2\text{H}_2\text{O} + 2\text{Cl}^- = \text{H}_2 + 2\text{OH}^- + \text{Cl}_2$ |
| > 11 | Strong alkaline | Violet/Purple | |

Since, during the electrolysis alkalinity of solution increases, the universal indicator's color will change from green to purple.