**Predicting the products of electrolysis**

**Qn**. **Predict** the products of the electrolysis of:

 **CuCl2(l) CuCl2(aq) CuCl2(c) CuCl2(aq):Cu electrodes**

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| --- | --- | --- | --- |
| **Species present**: Cu2+, Cl- | **Species present**: Cu2+, Cl-,H2O | **Species present**: Cu2+, Cl-,H2O | **Species present**: Cu2+, Cl-, H2O, Cu |
| **Relevant** half-equationsCl2(g) + 2e- ⇄**2Cl-**(aq) 1.36 **Cu2+**(aq) + 2e- ⇄ Cu(s) 0.34**Bold print** = presentUnderlined =actually reacting | **Relevant** half-equationsCl2(g) + 2e- ⇄**2Cl-**(aq) 1.36O2(g)+4H+(aq)+4e- ⇄**2H2O**(l) 1.23**Cu2+**(aq) + 2e- ⇄ Cu(s) 0.34**2H2O**(l) + 2e- ⇄H2(g)+2OH-(aq) -0.83 | **Relevant** half-equationsCl2(g) + 2e- ⇄**2Cl-**(aq) 1.36O2(g)+4H+(aq)+4e- ⇄**2H2O(l**) 1.23**Cu2+**(aq) + 2e- ⇄ Cu(s) 0.34**2H2O**(l) + 2e- ⇄H2(g)+2OH-(aq) -0.83**Strongest oxidant reacts with strongest reductant** | **Relevant** half-equationsCl2(g) + 2e- ⇄**2Cl-**(aq) 1.36O2(g)+4H+(aq)+4e- ⇄**2H2O**(l) 1.23**Cu2+**(aq) + 2e- ⇄ **Cu(s**) 0.34**2H2O**(l) + 2e- ⇄H2(g)+2OH-(aq) -0.83 |
| **Reactions occurring**2Cl-(l) 🡪 Cl2(g) + 2e- anodeCu2+(l) + 2e-🡪 Cu(l) cath2Cl-(l)+ Cu2+(l)🡪Cu(l)+Cl2(g)  | **Reactions occurring**2H2O(l) 🡪 O2(g)+4H+(aq)+4e anodCu2+(aq) + 2e-🡪 Cu(s) cath2H2O(l) + 2Cu2+(aq)🡪 2Cu(s) + O2(g) +4H+(aq) | **Reactions occurring**2Cl-(l) 🡪 Cl2(g) + 2e- anodeCu2+(l) + 2e- 🡪 Cu(s) cath2Cl-(aq)+ Cu2+(aq)🡪Cu(s)+Cl2(g)  | **Reactions occurring**Cu(s) 🡪 Cu2+(aq) + 2e- anodeCu2+(aq) + 2e- 🡪 Cu(s) cathCu(s) + Cu2+(aq)🡪Cu(s) + Cu2+(aq) |
| **Products**Copper metal and chlorine gas | **Products**Copper metal and oxygen gas | **Products**Copper metal and chlorine gas | **Products**Copper ions and copper metal |