

Electrode kinetics: The hydrogen overpotential of metals 06.18

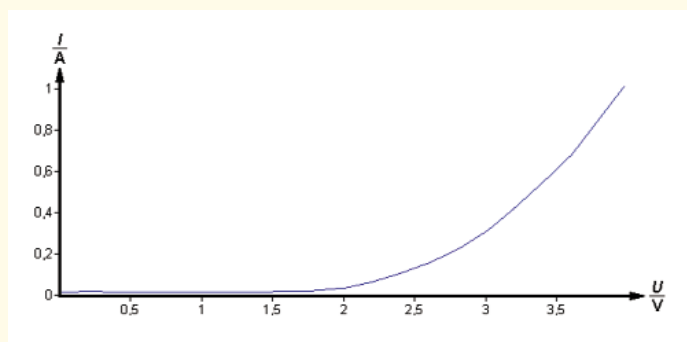
What you can learn about

- Electrode kinetics
- Polarization
- Overpotential
- Voltammetry and current-potential curves
- Polarography

Principle and tasks

Electrode polarization and the presence of overpotentials are important concepts in understanding electrode processes. They underlie the fact that galvanic cells always deliver current at less than the equilibrium e.m.f. and that an applied potential greater than the equilibrium e.m.f. is required in order to drive a reaction in an electrolytic cell.

The current-potential curve for the electrolysis of a 1 M hydrochloric acid solution is recorded using graphite rod electrodes, and the decomposition voltage is determined. By replacing the graphite rod cathode with a series of different metal rod electrodes, the overpotentials for hydrogen evolution at these metals can be compared.



Current-potential curve for the electrolysis of HCl solution using graphite electrodes.

What you need:

Cobra3 Basic-Unit	12150.00	1
Power supply 12V/2A	12151.99	1
Data cable, RS232	14602.00	1
Software Cobra 3 Universal writer	14504.61	1
Current probe 6A	12126.00	1
Power supply, universal	13500.93	1
Retort stand, $h = 750$ mm	37694.00	1
Right angle clamp	37697.00	1
Holder for 2 electrodes	45284.01	1
Connecting cord, $l = 500$ mm, red	07361.01	2
Connecting cord, $l = 750$ mm, red	07362.01	1
Connecting cord, $l = 750$ mm, blue	07362.04	1
Beaker, 150 ml, short	36012.00	6
Laboratory thermometer, $-10... +50^{\circ}\text{C}$	38034.00	1
Carbon electrodes, $d = 7$ mm, $l = 150$ mm	44512.00	1
Copper electrode, $d = 8$ mm, $l = 150$ mm	45201.00	1
Iron electrode, $d = 8$ mm, $l = 150$ mm	45204.00	1
Lead electrode, $d = 8$ mm, $l = 150$ mm	45203.00	1
Nickel electrode, $d = 8$ mm, $l = 150$ mm	45205.00	1
Zinc electrode, $d = 8$ mm, $l = 150$ mm	45288.01	1
Stopwatch, digital, 1/100 s	03071.01	1
Hydrochloric acid, 1.0 M, 1000 ml	48454.70	1
Water, distilled, 5 l	31246.81	1
PC, Windows® 95 or higher		
Millimeter paper		
Pencil		

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