

Titration curves and buffering capacity with Cobra SMARTsense

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Principle

pH values can be measured with the aid of electrochemical measurements and proton-sensitive electrodes (e.g. glass electrodes). By combining a glass electrode with a reference electrode in one housing, a single-rod glass electrode, which is appropriate for acid-base titrations, is created. The titration curves allow an exact determination of the equivalence point in titrations of strong and weak acids and bases.

Benefits

- Drop counter optimizes the experimental procedure
- Simplified implementation: all pre-settings already prepared
- Extensive automation of the experiment allows concentration on the learning objectives

Tasks

1. Determine the titration curves of different neutralisation reactions.
2. Determine the titration curve of an ampholyte (glycine).
3. Determine the buffering capacity of various aqueous acetic acid/sodium acetate mixtures at different total concentrations.

Learning objectives

- Strong and weak electrolytes
- Hydrolysis
- Dissociation of water
- Amphoteric electrolytes
- Isoelectric point
- Law of mass action
- Indicators
- Glass electrode
- Activity coefficient
- Buffering capacity
- Henderson-Hasselbalch equation

Necessary accessories

- Precision balance 6200g/0.01g

Software provided. Computer not included.

Scope of delivery

Cobra SMARTsense Dropcounter - Sensor for measuring drops and pH during titration 0 ... ∞ / 0 ... 14 (Bluetooth + USB)	12923-00	1
USB charger for Cobra SMARTsense and Cobra4	07938-99	2
measureLAB, multi-user license	14580-61	1
Holder for sensors with support rod	12680-00	2
Immersion probe NiCr-Ni, teflon, 300 °C	13615-05	1
Magnetic stirrer without heating, 3 ltr., 230 V	35761-99	1
Magnetic stirring bar 30 mm, cylindrical	46299-02	1
Retort stand, h = 750 mm	37694-00	1
Universal clamp	37715-01	1
Right angle boss-head clamp	37697-00	3
Burette clamp, roller mount., 2 pl.	37720-00	1
Burette, lateral stopcock, Schellbach, 25 ml	MAU-24022021	1
Burette, lateral stopcock, Schellbach, 50 ml	MAU-24022024	2
Volumetric flask, Borosilicate, 100 ml, IGJ12/21	36552-00	4
Volumetric flask, Borosilicate, 100 ml, IGJ12/21	36551-00	1
Volumetric flask, Borosilicate, 100 ml, IGJ12/21	36550-00	7
Graduated pipette 25 ml	36595-00	1
Graduated pipette 25 ml	36600-00	1
Volumetric pipette, 50 ml	36575-00	1
Volumetric pipette, 50 ml	36576-00	1
Volumetric pipette, 50 ml	36580-00	5
Volumetric pipette, 50 ml	36581-00	5
Pipettor	36592-00	1
Pipette dish	36589-00	1
Pasteur pipettes, 250 pcs	36590-00	1
Rubber caps, 10 pcs	39275-03	1

Beaker, Boro, high-form	46027-00	1
Beaker, Boro, high-form	46026-00	1
Beaker, Boro, high-form	46025-00	1
Funnel, glass, top dia. 50 mm	34457-00	2
Funnel, glass, top dia. 50 mm	34459-00	3
Spoon, special steel	33398-00	1
Wash bottle, plastic, 500 ml	33931-00	1
Acetic acid, 1 M sol., 1000 ml	48127-70	1
Caustic soda solution, 1.0 m, 1000 ml	48329-70	1
Hydrochloric acid, 1.0 mol/l, 1000 ml	48454-70	1
Ortho-phosphoric acid 85% 250 ml	30190-25	1
Glycocol /glycine/ 100 g	31341-10	1
Sodium acetate, anhydr. 250 g	31612-25	1
Water, distilled 5 l	31246-81	2
Weighing dishes, square shape, 84 x 84 x 24 mm, 500 pcs.	45019-50	1
pH-electrode, plastic body, gel, BNC	46265-15	1
Cobra SMARTsense Thermocouple - Sensor for measuring temperature -200 ... +1200 °C (Bluetooth + USB)	12938-01	1
Holder for Cobra SMARTsense	12960-00	1