

Dissociation equilibrium with Cobra SMARTsense

Article no: P3030967



Principle

Carboxylic acids are potential electrolytes which exist in a weakly dissociated condition in aqueous solutions. The location of the dissociation equilibrium is quantitatively described by the K_a or pK_a value which can be determined with potentiometric measurements.

Benefits

- Simplified implementation: all pre-settings already prepared
- Drop counter optimizes the experimental procedure

Tasks

1. Measure the alteration of the pH value during a titration of approximately 0.1 molar aqueous solutions of formic acid, acetic acid, monochloroacetic acid, propionic acid, butyric acid and lactic acid with a 0.1 molar sodium hydroxide solution at constant temperature using Cobra SMARTsense-system.
2. From the neutralisation curves read the pK_a values of the acids and compare them.

Learning objectives

- True and potential electrolytes
- Strong and weak acids
- Law of mass action
- Henderson-Hasselbalch equation
- Dissociation constant and pK_a value
- Substituent effects
- Potentiometry

Necessary accessories

- Precision balance 620g/0.001g

Software included. Computer not provided.

Scope of delivery

Cobra SMARTsense Dropcounter - Sensor for measuring drops and pH during titration 0 ... ∞ / 0 ... 14 (Bluetooth + USB)	12923-00	1
measureLAB, multi-user license	14580-61	1
Immersion probe NiCr-Ni, teflon, 300 °C	13615-05	1
Magnetic stirrer without heating, 3 ltr., 230 V	35761-99	1
Magnetic stirring bar 15 mm, cylindrical	46299-01	1
Beaker, Boro, high-form	46025-00	2
Beaker, Boro, high-form	46032-00	1
Beaker, Boro, high-form	46027-00	1
Volumetric flask, Borosilicate, 100 ml, IGJ12/21	36548-00	6
Volumetric pipette, 50 ml	36577-00	6
Pipettor	36592-00	1
Pipette dish	36589-00	1
Pasteur pipettes, 250 pcs	36590-00	1
Rubber caps, 10 pcs	39275-03	1
Microspoon, steel	33393-00	1
Wash bottle, plastic, 500 ml	33931-00	1
Acetic acid 99...100%, pure 1 l	31301-70	1
Monochloroacetic acid 100 g	30060-10	1
Propionic acid, 500 ml	31753-50	1
N-butyric acid 100 ml	30047-10	1
Lactic acid 100 ml	30264-10	1
Caustic soda sol., 0.1M 1000 ml	48328-70	1
Water, distilled 5 l	31246-81	1
pH-electrode, plastic body, gel, BNC	46265-15	1
Support rod, stainless steel, different lengths	02030-15	2
Right angle boss-head clamp	37697-00	3

Retort stand, h = 750 mm	37694-00	1
USB charger for Cobra SMARTsense and Cobra4	07938-99	2
Burette clamp, roller mount.,1pl.	37720-01	1
Burette, lateral stopcock, Schellbach, 50 ml	MAU-24022024	1
Cobra SMARTsense Thermocouple - Sensor for measuring temperature -200 ... +1200 °C (Bluetooth + USB)	12938-01	1
Holder for Cobra SMARTsense	12960-00	1