



Working instruction for student

Determination of viscosity of glycerol by two methods in a cosmetic sample

1. Interpretation for practice

You are a chemist in a pharmaceutical company which, among other activities, analyzes glycerol for cosmetic products. Your today's task is to determine viscosity of glycerol in a cosmetic product. You will determine viscosity of glycerol by two apparatuses. You have to compare the measured data with tabulated ones.

2. Apparatus and Chemicals

- Höppler´s viscometer (falling ball viscometer)
- Ubbelohde viscometer (capillary viscometer)
- pycnometer
- graduated cylinder
- beaker
- analytical scales
- thermostat
- glycerol
- ethanol
- distilled water

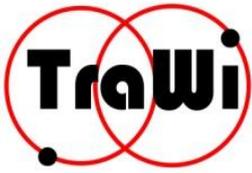
3. Procedure

Höppler´s viscometer:

- Set temperature of a thermostat
- Temper the viscometer for 15 minutes in the thermostat at the temperature of 20 °C
- Check the temperature, it must be constant through the measurement
- Prepare Höppler´s viscometer
- Rinse viscometer by distilled water
- Put together the viscometer
- Fill up the viscometer by distilled water
- Measure the time of the ball falling between two marks in distilled water
- Perform the measurement twice
- Rinse the viscometer with ethanol
- Let the viscometer dry up
- Rinse the viscometer by small amount of glycerol (sample 1)

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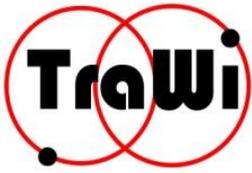
- Fill up the viscometer by glycerol (sample 1)
- Measure the time of the ball falling between two marks in glycerol (sample 1)
- Perform the measurement twice
- Rinse the viscometer with ethanol
- Let the viscometer dry up
- Rinse the viscometer by small amount of glycerol (sample 2)
- Fill up viscometer by glycerol (sample 2)
- Measure the time of the ball falling between two marks in glycerol (sample 2)
- Perform the measurement twice
- Calculate the average time for the glycerol from samples 1 and 2 and for water.

Ubbelohde viscometer:

- Prepare Ubbelohde viscometer, the viscometer is already clean and dry.
- Rinse the viscometer by distilled water
- Fill up the viscometer by distilled water
- Liquid must be between the two marks in lower part of the viscometer
- Use thermostat Tamson TV 2000
- Set temperature of the thermostat
- Let the viscometer temper for 15 minutes in the thermostat at the temperature of 20 °C
- Check temperature, it must be measured at constant temperature
- Take the viscometer out of the thermostat
- Measure time between two marks (one above and one below the upper bulb - indicates a known volume)
- Perform the measurement twice
- Calculate the average time for water
- Rinse the viscometer with ethanol
- Let viscometer dry up
- Rinse the viscometer by glycerol taken from a stock solution (sample 1)
- Fill up the viscometer by glycerol (sample 1)
- Place the viscometer to the thermostat (controlled temperature bath)
- Measure time between two marks (one above and one below the upper bulb - indicates a known volume)
- Calculate the average time for the glycerol (sample 1)
- Rinse the viscometer with ethanol
- Let the viscometer dry up
- Rinse the viscometer by glycerol (sample 2)
- Fill up the viscometer by glycerol (sample 2)

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- Place the viscometer to the thermostat (controlled temperature bath)
- Measure time between two marks (one above and one below the upper bulb - indicates a known volume)
- Calculate the average time for glycerol sample 2

Pycnometer:

- Weigh on dried and cleaned pycnometer with the stopper (on an analytical scales)
- Fill the pycnometer with the distilled water approximately to the half of the neck
- Let it temper for 15 minutes in the thermostat at the temperature of 20 °C
- Take the pycnometer out of the thermostat and close it with the stopper
- Dry the pycnometer perfectly and weigh it
- Empty the pycnometer
- Let pycnometer dry up
- Rinse the pycnometer with glycerol and fill it with glycerol approximately to the half of the neck
- Let it temper for 15 minutes in the thermostat at the temperature of 20 °C
- Take the pycnometer out of the thermostat and close it with the stopper
- Dry the pycnometer perfectly and weigh it
- All these steps perform with the second dry and clean pycnometer and perform measuring for water and glycerol sample 2.

4. Evaluation

Put all data in an organized table. Calculate viscosity.
Compare results of viscosity obtained by two methods.

5. Disposal

Put samples of glycerol back to a flask with a stock solution.