INE-X-4

MELTING-POINT APPARATUS WITH MICROSCOPE

OPERATING INSTRUCTION

Please read through these operating instruction before using

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I. APPLICATION

According to the definition of physical chemistry, the melting-point of a substance means the temperature at which the substance changes from solid state to liquid state. In the fields of organic chemistry, the measurement of melting point is a basic means of recognizing the nature of substance, and is also one of the important methods of measuring purity.

Melting-point apparatus with microscope could be used to research and observe the physical change of a substance, for example shape, color and three states change under the heating state.

The instrument also could use slide to measure the melting-point, shape change, color change etc, use capillary according to the rules of pharmaceutical law to measure the melting-point, especially to dark colored sample like medicine intermediate, dyestuff, rubber accelerant, could observe the whole process of melting.

II. FEATURE

i. This meter use method of capillary to measure. ZL02215087.0 for patent applying.

ii. In accordance with special request, this meter can measure by a piece of covering glass—a piece of carrier glass too.

iii. This meter displays digital temperature-value of melting-point by LCD.

iv. The control system of heating and microscope are combined together so that the construction is simple, reliable and using easily.

v. Heating rate can be adjusted continuously. We suggest that you use heating rate of 1°C/min to measure value of heating point. If you record the site of heating rate of 1 °C/min and the number of changeable-resistor in the first time you use the meter, you can use this heating rate to satisfy with your request not to need to do so again.

Note: i) Influence of room temperature: at the same band switch and number of
changeable-resistor, the lower the room temperature, the slower the heating rate. ii) The influence of electronic component due to the aging of the electronic component if you fix your heating rate for using the number of changeable-resistor may change, you only need small calibration. The bigger the number, the faster the heating rate.

III. SPECIFICATIONS
INE-X-4
- Optic magnification: objective lens 4X
eye lens 10X
- Melting-point measurement range: room temperature-360˚C
- Repeatability: room temperature~200˚C ±1˚C
  200˚C~300˚C ±2˚C
- Minimum reading: 0.1˚C
- Power supply: 220V, 50Hz, 80W

INE-X-4B: binocular
- Optic magnification: objective lens 4X
eye lens 6.3X or 2.5X

<table>
<thead>
<tr>
<th>Eye lens</th>
<th>Magnification</th>
<th>indicating dial</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3X</td>
<td>4X, 6.3X, 10X, 16X, 25X</td>
<td>Left black</td>
</tr>
<tr>
<td>25X</td>
<td>16X, 25X, 40X, 63X, 100X</td>
<td>Right red</td>
</tr>
</tbody>
</table>

Working distance of objective lens: 100mm

The microscope have inclined binocular of 45 degree, diopter regulation ring on right eyepiece tube. If the user has binocular diopter difference, adjust microscope to get clear imaging of left eye firstly, then adjust diopter regulation ring on right eyepiece tube to get clear imaging of right eye. Binocular could rotate relatively in definitive angle according to the distance of user two eyes.
- Melting-point measurement range: room temperature-360˚C
IV. CONSTRUCTION AND PRINCIPLE

The microscope and heating system are combined with together. Temperature detector is inserted for using easily. Microscope is used to view the whole process which the sample changes and melts after heated.

Heating furnace is heated by electronic heater and with fans to cool the meter fast. It can be not only use the method of pieces of carrier glasses but also use the method of capillary to measure a sample.

V. OPERATION

i. First time to use this meter, you must turn on the power and put the switch to the site of heating, through microscope viewing whether the center light hole of heating furnace is in sight, if the hole deflects left or right, you can adjust microscope to right or left. If the hole deflects front or back, you can first loosen two screws (note:: only loosen not take down) beside heating furnace, then move the heating furnace until it is in center, at last lock two screws. When you move heating furnace, in order to prevent burning your fingers, please put the band switch and changeable-resistor to the smallest site. (turn the switch around anticlockwise direction to the end).

ii. Use the stopwatch to calibrate heating rate, first record temperature in a time, after 1 minute, record temperature again. You record temperature continuously, until you gain the value of melting-point which you want to.
This heating rate is 1°C/min. If heating rate is too slow or too fast, you can calibrate the wide and small calibration knob. Note: Though you have not moved wide and small calibration knob, with temperature rising, the heating rate may turn slower too.

iii. Insert the sensor of measuring temperature into the bottom of the hole of heating furnace. If its site does not correct, maybe, it effects the accuracy of measuring.

iv. If you want to gain accurate value of melting-point, the standard sample can be measured first to get corrected value (corrected value=standard value – measuring value), as the basis for correcting. Note: value of melting-point of the standard sample should be selected as nearly as possible to the value of the sample you want to measure. (At this time, value of melting-point=measuring value of this sample + corrected value).

v. The measured sample must be baked or put into drying jar to be dry. The powders must be pulverized to small.

vi. when you use carrier-covering pieces of glass to measure, we suggest that first put covering a piece of glass (thin glass) on the heating furnace, then put powder of medicine, at last put on a piece of carrier glass to measure.

vii. If the minimum place of reading is changing (between 8 and 9), the result should be 8.5°C.

viii. When repetition measurement, the switch is put the “off” position, stop heating and cooling to the below 10°C naturally, now could re-measure.

ix. After finishing measurement, should cut off the power supply, put the instrument into the case until cooling to the room temperature.

VI. MATTERS NEED ATTENTION

i. The main use of this apparatus is observing the melting process of a substance, not metrical instrument.
ii. The surface of lens maybe have dirt after long-term use, could use pledget dipped in alcohol to wipe.

iii. Avoid humidity and acid.

VII. DIAGRAMMATIC SKETCH

1. Control panel
2. Temperature display
3. Microscope lock screw
4. Eye lens
5. Microscope focusing screw
6. Objective lens
7. Insert hole of thermometer detection head
8. Cooling fan, its back side is Insert hole of capillary
9. Light control
10. Apparatus base, its back side is Fuse socket and Electric outlet
## VIII. COMMON BREAKDOWN AND HANDLING

<table>
<thead>
<tr>
<th>Breakdown Appearance</th>
<th>Analyses for Reason</th>
<th>Handling method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not heating.</td>
<td>Fuse (1A) is broken.</td>
<td>Change.</td>
</tr>
<tr>
<td></td>
<td>Turn wave band switch to 0 position.</td>
<td>Turn the switch to the maximum position clockwise.</td>
</tr>
<tr>
<td></td>
<td>Electrically heated wire is broken.</td>
<td>Change.</td>
</tr>
<tr>
<td>No image in the microscope.</td>
<td>The lamp is not lit.</td>
<td>Change.</td>
</tr>
<tr>
<td></td>
<td>The lens cone is not aim at light hole.</td>
<td>Loosen Microscope lock screw and move left and right until see the image.</td>
</tr>
<tr>
<td>Heating but the heating lamp not light.</td>
<td>The lamp is broken.</td>
<td>Change.</td>
</tr>
</tbody>
</table>