ROQED PHYSICS LAB

Determination of the specific heat of melting of ice.

Purpose: determine the specific heat of melting of ice.

Devices and materials:
034 - Thermometer,
038 - Calorimeter,
070 - scales,
036 - a piece of ice.

Theoretical part:
The specific heat of melting of ice can be determined in the following way. If you pour warm water with a mass of minto a glass of the calorimeter$_1$ and a temperature of t_1 and lower ice with a mass of minto it$_2$ at a temperature of $t_3 = 0$ ° C, then when all the ice melts, the temperature t_2 in the calorimeter will be determined by the following equation:
$m_2\lambda + m_2c\ (t_2 - t_1) = m_1c\ (t_1 - t_2) + m_kc_k(t_4 - t_2)$
Where λ is the specific heat of ice melting, C is the heat capacity of water, m_k is the mass of the calorimeter , C_k is the specific heat capacity of the calorimeter substance, t_4 is the initial temperature of the calorimeter.
The execution of the experiment and calculation can be simplified if thecarried out experiment isin such a way that the initial t_4 and final t_2 values of the calorimeter temperature are the same. In this case, the heat balance equation takes the form:
$m_2\lambda + m_2c\ (t_2 - t_3) = m_1c\ (t_1 - t_2)$
Taking into account that $t_3 = 0^0$ C, the specific heat of melting of ice from this equation is equal to:

$$\lambda = \frac{cm1(t1-t2) - m2ct2}{m2}$$

(with a temperature of about 60 ° C)
Result $\lambda = 3.3 * 10^5$ J / kg.

t in the room = 25 degrees Celsius

Work progress:

1. Assemble the installation shown on the board.

2. Start the simulation.

3. Zapishite in Table room temperature t2, which is shown by the thermometer.

4. Fill a glass with ice. The ice stood for some time at room temperature and its temperature became 0 ° C.

5. Pourinto the calorimeter 250 ml. (V_1) warm hot inodes ($m_1 = 250\ gr.$) and andmeasure its temperature t1. Record the result in the Table.

6. Take a piece of ice from a container and immerse it in warm water in the calorimeter. After the first piece of ice has completely melted, put the second one in the water, and so on until the water temperature in the calorimeter reaches the value t_2, which is equal to the air temperature in the room.

6. Add ice cubes to the calorimeter until the temperature reaches room temperature t2

7. Pour water from the calorimeter into the measuring cylinder. Record in the Table the value of the volume of water V_2

8. Increased water $\Delta V = V_2 - V_1$ is the masse of melted ice(m2).

7. Gather formula for the in theCalculate the eniya The specificth heat ofs melting ice.

$$\lambda = \frac{cm1(t1-t2) - m2ct2}{m2} .$$

9. Ttable

m_1 (kg)	t_1 (^{0}C)	t_2 (^{0}C)	V_1 (ml)	V_2 (ml)	m_2 (kg)	λ, J / kg
0.25	...	...	250			

11 . Conclusion:
A. When a substance melts, the temperature remains unchanged, since all the energy is spent on the destruction of the crystal lattice.
In. When a substance melts, its temperature rises, as the internal energy increases.
C.When a substance melts, its temperature decreases, as the internal energy decreases.