Heating Curves and Phase Changes

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

A heating curve shows temperature as energy enters a sample. Assume pure substances, constant pressure, and negligible heat loss in these models.

1 During an upward-sloping part of a heating curve where the sample stays liquid, what increases?

(1) Average kinetic energy of its particles

(2) Mass of each particle

(3) Number of protons in each particle

(4) Amount of the sample

2 A solid is melting and its temperature stays constant. Explain what the added energy does. [1]

Answer and work

3 What phases coexist during the boiling plateau of a pure substance?

(1) Solid only

(2) Liquid only

(3) Liquid and gas

(4) Solid and gas

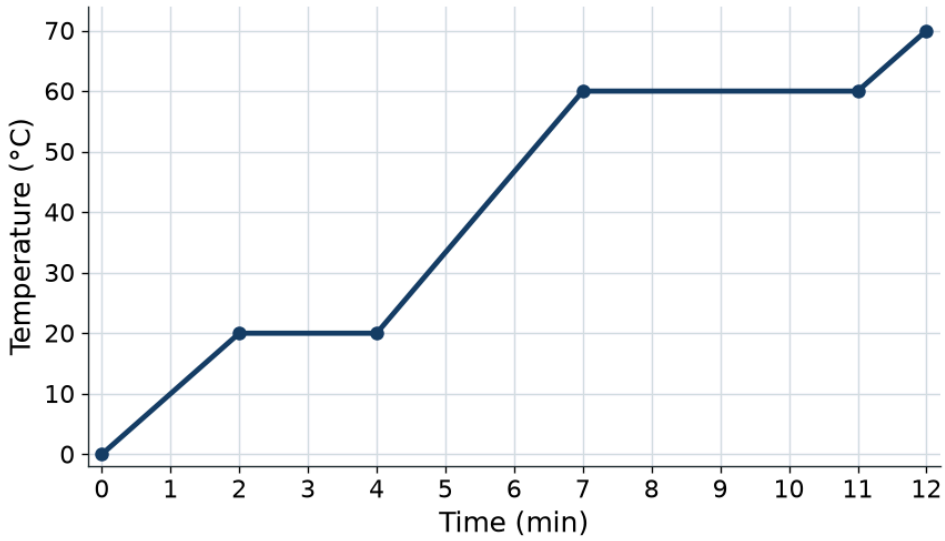
4 Explain why the temperature can start increasing again once all the solid has melted. [1]

Answer and work

Heating a Model Substance

Use the information below to answer the questions.

A heater supplies energy at a constant rate to a pure sample that begins as a solid. The graph shows the sample’s temperature over 12 minutes.



Heating curve for the model substance.

5 At what temperature does this substance melt in the model?

(1) 0 °C

(2) 20 °C

(3) 40 °C

(4) 60 °C

6 What single phase is present at 5 minutes? Use the graph to explain. [1]

Answer and work

7 Calculate the duration of the boiling plateau. Show which two times you read from the graph. [1]

Answer and work

8 The heater has the same power throughout. How does the energy supplied during boiling compare with that during melting?

(1) The energy for boiling is half as much.

(2) The energies are equal.

(3) The energy for boiling is twice as much.

(4) The energy for boiling is four times as much.