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Explain the task to each other again in your own words.

State what you understood the task to be and what is still unclear to you. Explain the task to each other again in your own words.

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Answer 1:

Using the phase diagram of water, we're supposed to explain how freeze-drying works.

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It's best for you to trace the freeze-drying path on the phase diagram step by step. Begin at room temperature and normal pressure.



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Answer 2:



Normal pressure means 1 bar, and we have to

estimate room temperature (approx. 20 °C) on the diagram.

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E fint 3

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The first step is to flashfreeze the food, for example, using liquid air. Trace the path for this on the phase diagram.

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Answer 3:



During flash-freezing, the pressure remains the same,

Answer 3:



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Now the pressure is reduced using a vacuum pump. Trace the further path on the diagram. What does this mean? Now the pressure is reduced using a vacuum pump. Trace the further path on the diagram. What does this mean?

Answer 4:

At low pressure, only the gas phase and the ice phase are adjacent to each other on the phase diagram. Now



the frozen water cannot melt anymore even if the temperature is increased again.

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You already know that ice still has a certain steam pressure even at extremely low temperatures. What can you do to make the frozen water in the frozen food turn into the gaseous form a little faster? Take a look at the phase diagram for help in finding the answer.



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Answer 5:

It's quite simple: You must add energy again to increase the temperature somewhat. Then the frozen



water will evaporate from the foods and they become dehydrated.

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Now you have all the information you need to answer the question of how freeze-drying works from a physics point of view.

Write a short, coherent paragraph.



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Answer 6:

The food to be frozen is quickly cooled to a very low temperature. Then the pressure is reduced using a vacuum pump until the water cannot become liquid anymore. Then the temperature is increased again and the frozen water changes directly to the gas phase; this is how the frozen food is dehydrated.

Answer 6:

The food to be frozen is quickly cooled to a very low temperature. Then the pressure is reduced using a vacuum pump until the water cannot become liquid anymore. Then the temperature is increased again and the frozen water changes directly to the gas phase; this is how the frozen food is dehydrated.